5 1928
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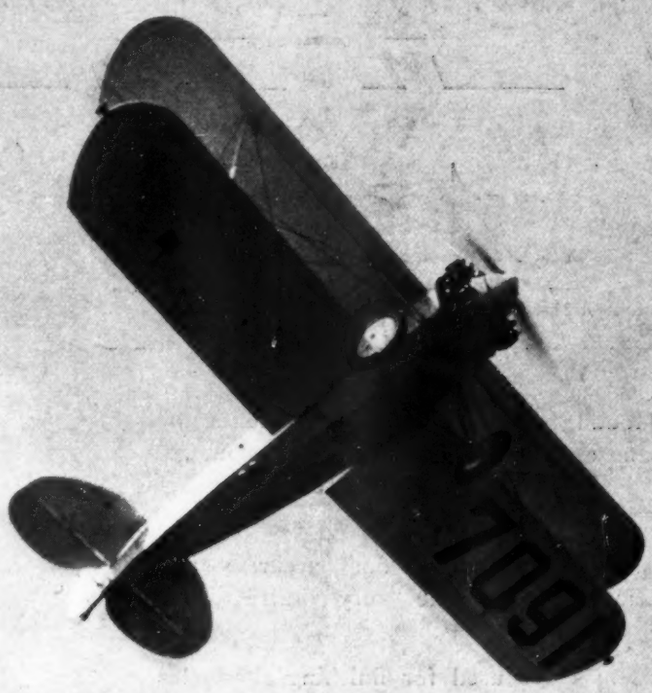
AVIATION

The Oldest American Aeronautical Magazine

NOVEMBER 3, 1928 Issued Weekly PRICE 20 CENTS



A "Whirlwind" powered Waco going into a climbing turn.

VOLUME XXV

NUMBER 19

Special Features

The "Golden Eagle"

Airplane Engine Ignition

Wanted: Suitable 1929 Air Tour Formula

AVIATION PUBLISHING CORPORATION
250 WEST 57TH STREET, NEW YORK

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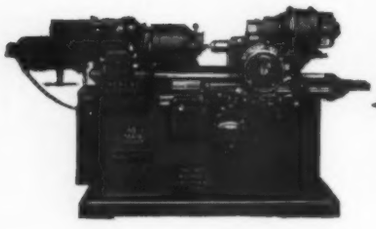
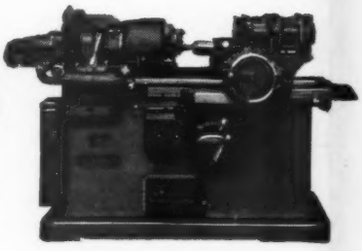
HEALD



Automatics
For Fussy Work



Nowhere can there be found more exacting requirements for production than on airplane engine parts. As one engine manufacturer recently stated in his advertising, "A scratch means throw it away."

Brought to a semi-finished condition, the final accuracy and quality of practically all moving parts, the "very vitals" of the engine, are obtained by grinding.

Heald AUTOMATIC Internals are used for finishing the holes in cylinders, pistons, connecting rods, gears, tappet guides, holder links, rolls, etc., by the leading airplane engine parts manufacturers.

The fact that these manufacturers have ordered and reordered is the greatest recommendation that can be obtained for Heald AUTOMATICS which today have incorporated in them over five years' experience from hundreds of installations on all classes and kinds of work.

Get our Bulletins on how Heald handles airplane engine parts.

THE HEALD MACHINE Co.

WORCESTER MASS., U. S. A.

Has held the confidence of the trade for over 100 years

THANK YOU *for mentioning* AVIATION

the U·S·AIR MAIL

attests these facts by its use of

Pedrick

HEAT-SHAPED

PISTON RINGS

When the Air Mail Division, U. S. Post Office Department, inaugurated the Air Mail Service, PEDRICKS were chosen as piston ring equipment. The use of PEDRICKS by the Government-operated air lines was continued right up to the time when private contractors took over the service. Now many of the privately operated lines have standardized on PEDRICKS.

This record of long-continued service in Air Mail planes surely demonstrates the *dependability* of PEDRICKS to an extent that no *single flight*, however famed, could prove. PEDRICKS hold compression and prevent oil pumping [spark plug fouling]—and continue to do so indefinitely.

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Over great cities -TP- *Aero protects your motor*

-TP- Aero, the original and only all paraffin base ZERO POUR TEST oil, will keep its fluidity as low as *40 degrees below zero.* This is a straight run and not a blended or compounded oil. Its wax free feature is responsible for its low cold test as well as its outstanding fluidity at extremely low temperatures. It also holds its viscosity at extremely high motor temperatures. It is an entirely new oil, made especially for aircraft motors. If your dealer cannot supply you, advise us.

Have you tried -TP- Aero Rocker Arm lubricant, a pure paraffin base mineral oil product?

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Fort Worth, Texas

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Please send me, without obligation, your Pilot's Log Book, described above.

Name..... Address.....

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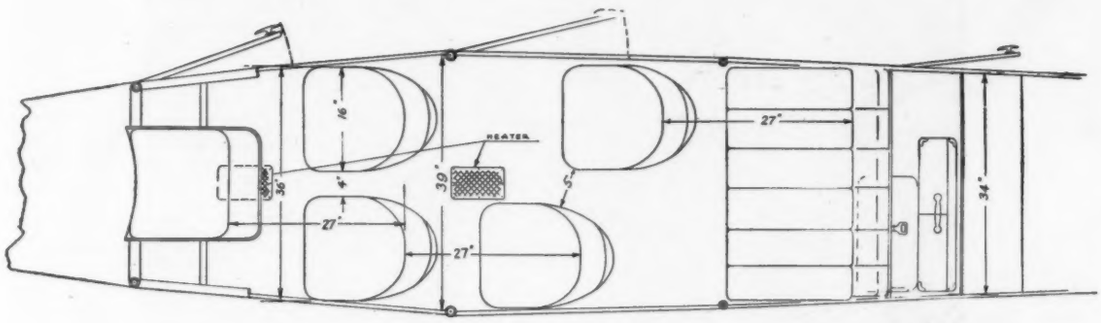
now ready

NEW FAIRCHILD CABIN MONOPLANE

for six passengers and pilot

Wasp engine ▲▲▲ top speed 140 m.p.h. ▲▲▲ Pay load 1837 lbs.



HERE is a real money maker. Gives you more pounds and more cubic feet of freight capacity than any other single engine cabin plane. And speed? 140 m. p. h.! Cruising range, 900 miles. Finally, the lowest list price of any plane of its class powered with a Wasp engine and completely equipped.

This new plane has all the proven Fairchild features which have made Fairchild the largest builder of single engine cabin planes—folding wings, materials and construction according to U. S. Army and Navy specifications, slotted ailerons giving a hitherto unknown degree of lateral control, wheel tail skid. This is the latest and finest heavy-duty cabin plane.

A combination of payload capacity, speed and airworthiness that should interest every operator and every business house considering an investment in air transportation service.

Write or wire for details.

The Fairchild Airplane Manufacturing Corp., 270 W. 38th St., New York City.

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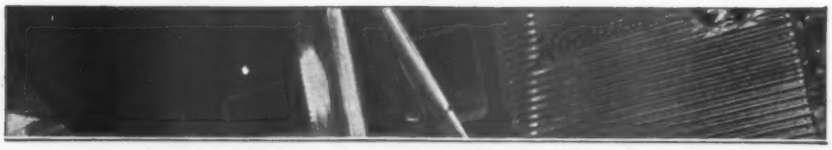

THE DOUBLE DUTY OF TIRES

THE opened throttle commands airplane tires to be fleet and nimble, to spin easily and swiftly as the ship hurries into flight.

And then, the journey over, these same tires must bear speeding weight and human life to safety as the plane strikes ground again.

Thus, in every flight Goodyear Airplane Tires reveal their agility and their strength. These tires assist take-off performance because they are perfectly balanced and hold their proper pressures. They withstand the punishment of fast or awkward landing because they are built of finest materials by men who know how important tires are to safety.

Goodyear Airplane Tires are offered by an organization that wants aviation to prosper. Goodyear makes everything in rubber for the airplane.

Aeronautics Department

THE GOODYEAR TIRE & RUBBER COMPANY, INC., AKRON, OHIO

GOODYEAR

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AIRPLANE TIRES

19 Years of experience, dating back to the infancy of the art of aeronautics, is behind the famous tri-color star of the Glenn L. Martin organization.

The Star in the Sky

MARTIN
U.S.A.
TRADE MARK

THE GLENN L. MARTIN COMPANY
Builders of Quality Aircraft since 1909
CLEVELAND, OHIO

The Martin 74 (shown below,) all-metal, air-cooled, three-purpose plane for naval or military use, is as active as a combat plane, yet establishes standards of safety, durability and dependability never before achieved in any type of plane.

The Martin 74, Reconnaissance, Bombing and Torpedo Plane

A New Criterion in Speed and Luxury

COMPETITIVE time-schedules — airports and routes at high altitudes—the ever-increasing tendency toward more complete electrical accessories, navigating instruments and luxurious equipment—these are some of the factors that have created an urgent demand for super-efficiency in design and super-engine-power *such as delivered in the Fokker Super-Universal.*

This plane has already influenced the general field of single-engine cabin monoplane design—another proof of Fokker leadership. Flying at 140 miles an hour, with immense reserve power and a climb of over 1,000 feet per minute, and controlled with characteristic Fokker ease and stability, *the Super-Universal has set new marks in commercial service* that no other cabin plane in its power range has equaled.

In addition to the experience of many private owners and transport lines, the recent swing around the nation flown by Capt. Haynes in Commander Byrd's Super-Universal proves beyond question that *here is a plane combining all the established Fokker features in a new criterion of speed and luxury.* In all load carrying and speed tests made during this six weeks' journey, even at Mexico City, with an elevation of 7,400 feet, the Super-Universal behaved with a perfect performance record. In over 25,000 miles of travel, visiting 40 airports previously unknown to the pilot, less than $25 was spent on repairs to engine and plane.

The Fokker
Super Universal

400 h.p. "Wasp" Engine

Convertible for Floats and Skis

Six passengers, two pilots, roomy cabin furnished in mahogany veneer and velour, with comfortable seats and large, glass sliding windows; large additional compartment for baggage or toilet; enclosed pilots' cockpit with full range of visibility under all weather conditions; 400 h.p. "Wasp" engine, and fuel range of 7 hours; readily fitted for mail or express transport, photography, mining and other commercial purposes.

The recent 300% increase in our manufacturing facilities at present enables us to offer quick delivery of the Fokker Universal and Super-Universal types; however, the constantly-increasing demand for these planes makes it advisable to order now to insure spring delivery.

FOKKER AIRCRAFT CORPORATION OF AMERICA

Factory: Wheeling, West Virginia

Subsidiary: Atlantic Aircraft Corporation, Teterboro Airport, Hasbrouck Heights, New Jersey

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WARMTH—Comfort—Safety—Combined in the popular Lamoglas "39" pictured above. Triple chenille binding, safe non-scatterable lenses, $6.00.

Lamoglas "36". Same as No. 39 but with double chenille binding. $5.00.

"Jack Frost" Navigator—same as the famous Lamoglas Navigator goggle—but with chamois lined sponge rubber mask extending to tip of nose. The newest safety goggle for winter flying. Per pair $10.00.

"Jack Frost" Seesall—same as the famous "Seesall" but with chamois lined sponge rubber mask extending to tip of nose for winter warmth. $16.50. With tinted lenses for flying over snow covered country. $20.00.

Sold by all good dealers.

Write for complete catalog. Send check with mail orders.

Lamoglas
EYES FOR THE SKIES

Wholesale orders, west of the Rockies, filled from stock by: R. Mohr & Sons, Mohr Building, San Francisco, Cal. In Canada: Erickson Aircraft Ltd. 45 Jarvis Street, Toronto.

BECK

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The man who tunes the plane

Both Are Trained at

Pictures at the left show, from top to bottom: Servicing a Cabin Monoplane; Building up a steel tube fuselage; Students building a new wing, and at bottom, Overhauling a Waco.

Pictures on the opposite page show the Administration Building and two training planes.

All photos taken at Parks Air College

With over a hundred airplane factories in the United States and over 1200 airports, transport lines and dealers, where are the trained men coming from? We have promised to furnish 200 men to *one factory alone!* Do you want one of these jobs?

It costs no more to get your training in the largest and most elaborately equipped Air School in the World. In fact it costs *less* to be thoroughly trained than poorly trained.

In the Airplane and Engine Mechanics Division of the Parks Air College, you are trained by experts. In the motor section we have Whirlwind, Velie, OX5, Liberty, Hispano, Caminez, and other famous engines. You tear these down, overhaul, rebuild, and test them!

In the airplane division you build up airplanes piece by piece—work on various makes of modern airplanes—build up complete new ships. You learn factory production methods, get line duty on the flying line servicing small and large planes. You are trained under active factory and airport conditions. The Parks job-way system trains you as you must be trained for success.

New factories, airports, airlines, dealers and associates are opening up *daily*. Parks training as an airplane and engine mechanic will qualify you for a *good* position that leads to salaries of $75 to $150 per week.

You can start your training the day you reach St. Louis and finish this great Airplane and Engine Mechanics Course in four months' time.

While you are in school you can live in one of our Dormitories, right on Parks Airport, eat in the Airport restaurant. There is a recreation room, with reading and writing facilities, radio, and phonograph for your entertainment.

Special Rate

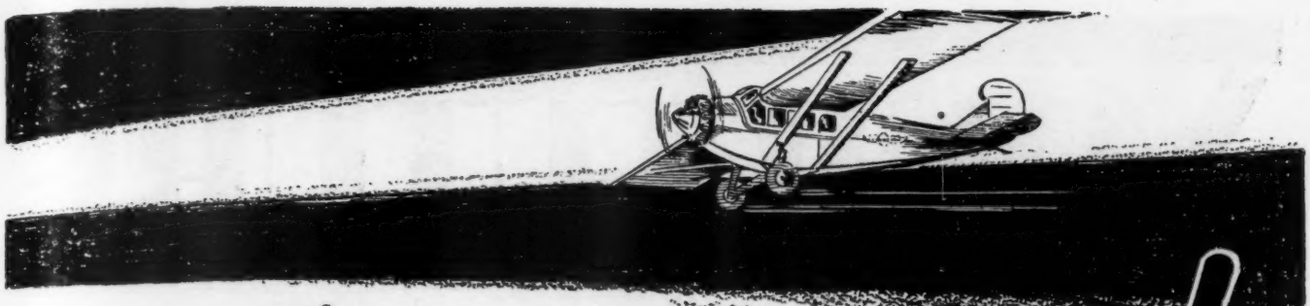
Right now, in order to provide mechanics for the new factory building on Parks Airport, we have a special low rate for the Airplane and Engine Mechanics' Course. Send the coupon on the opposite page immediately for our big 32 page catalog, "Skyward Ho!" which gives complete information about Parks Airport, all our courses, and opportunities for graduates.

Don't let this opportunity slip by!
Write at once!

PARKS Air

204-H Missouri Theatre Bldg.,

The Largest Civilian Air



and the man who rides the skies!

Parks Air College!

The future of the air is boundless and unlimited—but what about *your* future? Right now there is an acute and growing shortage of good pilots. A career of thrilling work can be yours after flying instruction at Parks Air College—big pay, a safe future and perhaps a fortune!

One organization alone has agreed to take 200 of our pilots by spring if we can supply them. Why don't *you* get one of these jobs?

The photos on these pages give you only a few glimpses of Parks Air College. We have 26 training planes, over $165,000 worth of training equipment, our own modern airport, hangars, classrooms, Dormitories, etc.

All our pilots are licensed transport pilots, carefully selected. You will like every one of them.

Thorough Instruction

To be a qualified pilot you must be taught straight flying, acrobats, forced landings, vertical banks, spins, crosswind landings, cross country flying, 90 degree, 180 and 360 degree landings and many other flight maneuvers.

But to pass the strict Government examination you must also know aerial navigation, aeronautical meteorology, areodynamics; be familiar with modern aircraft engines, and be able to rig, overhaul and adjust airplanes!

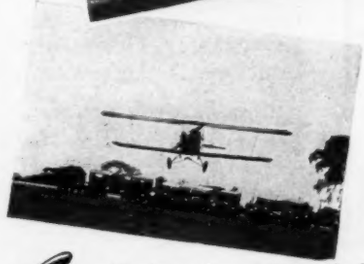
All this training is given in our great Pilots' Ground Course which takes two months to complete.

No wonder students have come to Parks Air College from every state in the Union and from several foreign countries!

Special Offer

If you are ambitious to become a real flyer—to become a nationally known figure—then choose Parks! Send at once for "Skyward Ho!" that gives full information about *all* our courses, pictures of Parks Airport, and details of a special limited offer that will save you over a hundred dollars!

If you are serious about your future in the sky, send the coupon for a free copy of the most interesting and inspiring book you have ever read. Send *now!*



All photos taken at Parks Air College

COLLEGE *inc.*

St. Louis, Mo.

School in America

Who will be the great pilots, the transport engineers, the airline owners of tomorrow? Many of them will be men who send the coupon today for "Skyward Ho!"

Parks Air College, Inc.,
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Send me "Skyward Ho!", describing and illustrating your Pilots' and Mechanics' Courses, with special offer saving me over $100.

Name .....

Address .....

YOUR FUTURE

with the

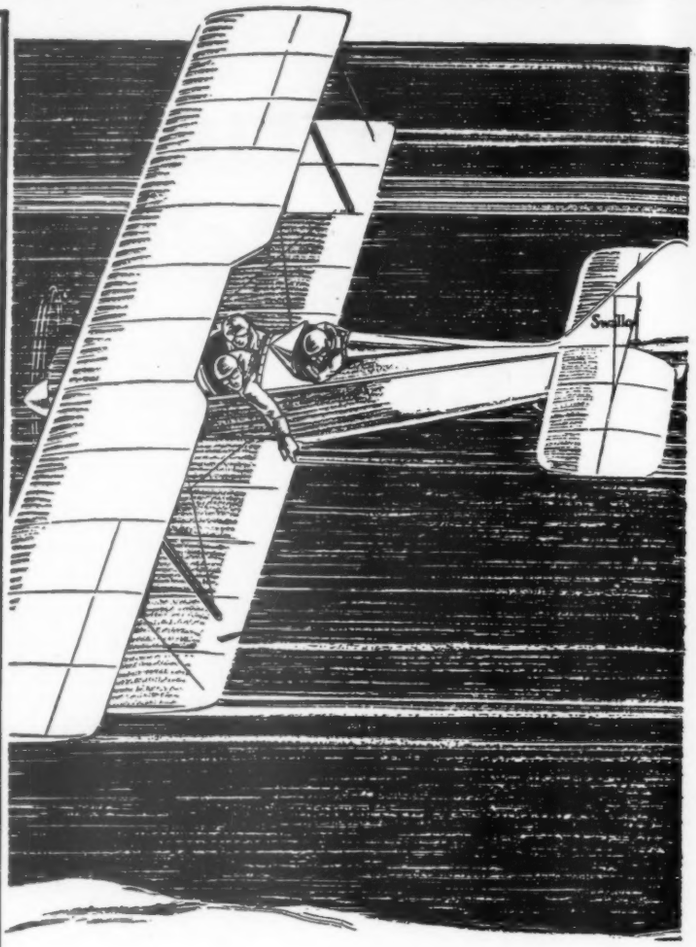
SWALLOW

As competition in the sale of airplanes increases, Swallow dealers are finding themselves more and more in an enviable position. Purchasers of planes are daily becoming more critical —they are insisting on knowing, not only the reputation of the plane itself, but the character of the organization behind it.

The dealer who handles the Swallow does not need to hesitate in answering these questions to the satisfaction of the prospective purchaser. He can tell the prospect that the Swallow—America's Pioneer Commercial Airplane—is the result of more years of actual experience in building successful aircraft than any other plane in the country. He can point out that the Swallow organization is one of the most stable in the industry today. He can show that the Swallow has built into it all the factors that make for safe flying. He can also show that the Swallow through actual performance, is the fastest stock model biplane, with any motor, on the market today.

That's why Swallow dealers make more sales—and more money—than any other. That's why the Swallow franchise is the most valuable of any.

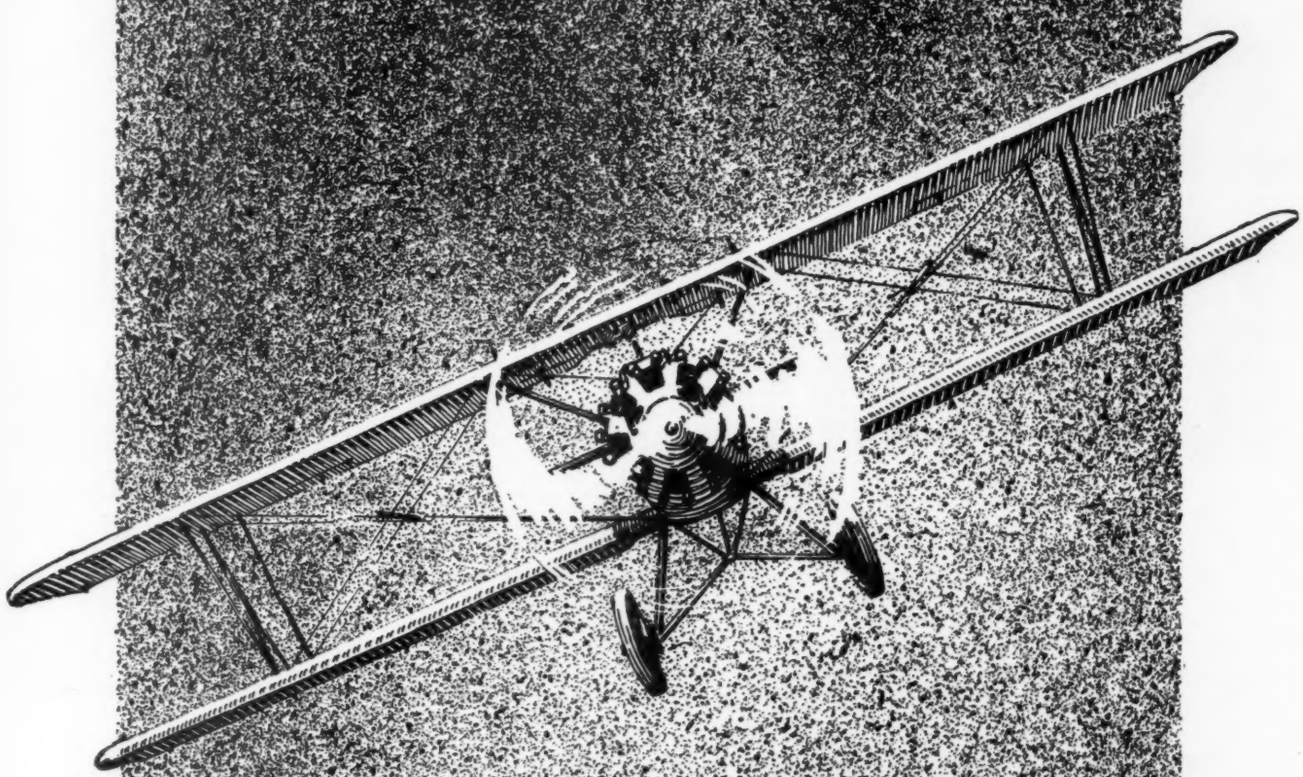
Wire or write us today for full details. Let us tell you all the facts that insure a successful future for the Swallow dealer.



Swallow Airplane Company

Wichita, Kansas

The Consolidated Courier



Consolidated Aircraft Corporation
Buffalo, N.Y.

CONSOLIDATED AIRCRAFT

THANK YOU *for mentioning* AVIATION

Announcing a New Siemens-Engine Service

An entire line of Siemens Engines will be on display at the International Aeronautical Exposition, Chicago, December 1 to 9. Visit our booth.

DUE to increased demand for Siemens Engines—heretofore known as RYAN-SIEMENS—the Siemens & Halske Company has found it advisable to arrange for direct contact with the trade. Therefore, Siemens & Halske will now handle sales and service directly through its direct Representative.

A service station with a complete stock of spare parts has been established at Curtiss Field, L. I. Other service stations, convenient to all aircraft centers, will be established at an early date.

It is planned to manufacture these engines in the United States in the near future.

All correspondence and inquiries should be addressed to

K. G. FRANK
CONSULTING ENGINEER
75 West Street, New York

General Representative

Siemens & Halske A.G.

Again Goodrich LEADS!

List of planes serviced by Goodrich truck crew at the National Aeronautical Exposition at Los Angeles

Vought Corsair
Mohawk Pinto (2 Planes)
Monocoupe (3 Planes)
Fokker Transport (Western Air) (2 Planes)
Douglas Ambassador
Fairchild (2 Planes)
Waco (9 Planes)
Klemm AKL-20 (2 Planes)
Swallow (2 Planes)
Command Aire (2 Planes)
Golden Eagle (2 Planes)
CM-1 (Ryan Mechanics Co.)
Federal
Lockheed-Vega (Woolaroc) (2 Planes)
Kreutzer
Stearman (2 Planes)
Prudden
Cavalier (Star Aircraft Co.)
Buhl Air Sedan
Ryan B-1 (8 Planes)
Boeing Transport
Stinson Detroiter (3 Planes)
Ryan M-1
Eagle Rock (9 Planes)
Buhl (3 Planes)
Air King (2 Planes)
Kreutzer SM-4
Travel Air (5 Planes)
Fokker Universal (2 Planes)
Baby Bullet
Special Built (College)
Curtiss Robin
Thunder Bird (2 Planes)
Lincoln Page (2 Planes)
D. H. Moth (Canadian) (3 Planes)
DeHaviland (School Ship)
American Eagle
Bach
American Moth
Challenger
Bellanca J
Pheasant
Swallow
Pitcairn Fleetwing
Simplex

Again . . . as *always* . . . Goodrich leads in the heavier-than-air field

THE reason for this lead is the keen interest Goodrich has from the beginning shown in the field of aviation.

This keen interest was demonstrated in a most practical way during the recent National Aeronautical Exposition at Los Angeles . . . . a Goodrich crew was ready to service any and every plane on the field and actually did service 98 planes.

Look at the list at the left and see what a large majority of the planes was serviced by Goodrich.

Goodrich—the pioneer in the field and present day leader—is not resting on its laurels but working untiringly toward further perfection in rubber manufacturing.

Aeronautical Development Department, THE B. F. GOODRICH RUBBER CO., Akron, Ohio

Goodrich Rubber *for Airplanes*

THANK YOU *for mentioning* AVIATION

ALL WINNING SHIPS *in National Air Races were finished with* BERRYLOID

Every winning ship in the National Air Races, and with only one or two exceptions every ship that finished in the money, was a Berryloid job. Clearly, Berry Brothers' Progressive Aircraft Finishes are the choice of America's airplane manufacturers. Developed to meet the exacting demands of air service, Berryloid is an elastic, durable finish that won't rub off and is not affected by gasoline or extremes of temperature. Get the utmost in beauty and protection for your planes—write for, "Specifications for Aircraft Finishing", an authoritative book in its third edition.

PROGRESSIVE AIRCRAFT FINISHES

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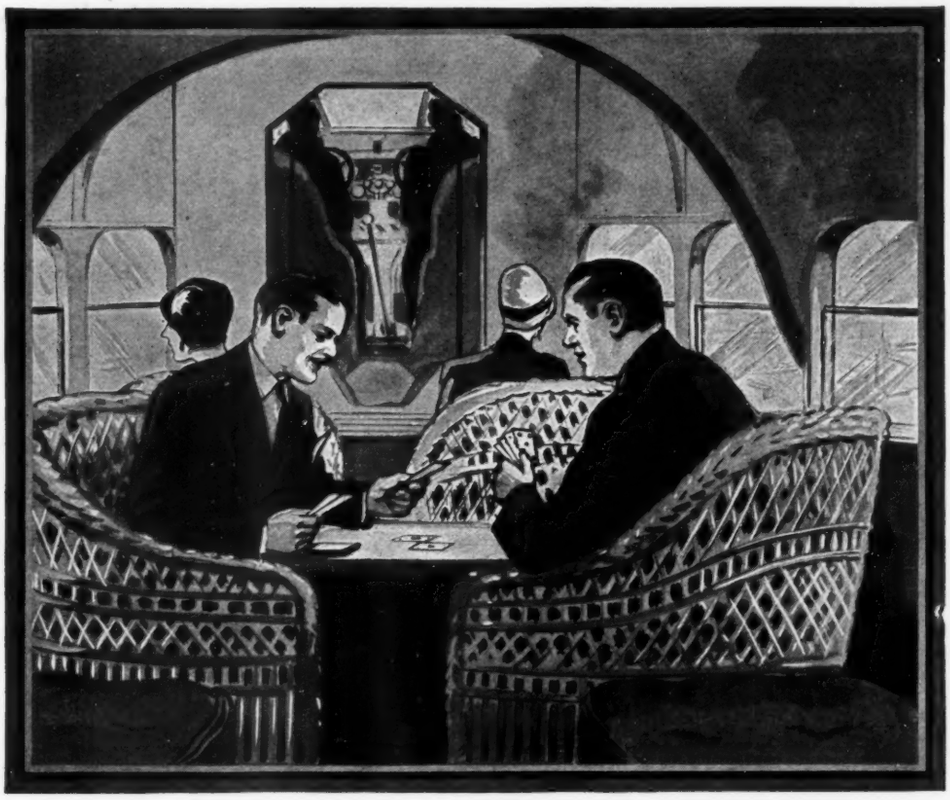
Varnishes Enamels and Lacquers
Detroit, Michigan 1858—*70th Anniversary*—1928 *Walkerville, Ont.*

Manufacturer of Progressive Aircraft Finishes



Safe Transportation

AERONAUTICAL CHAMBER OF COMMERCE

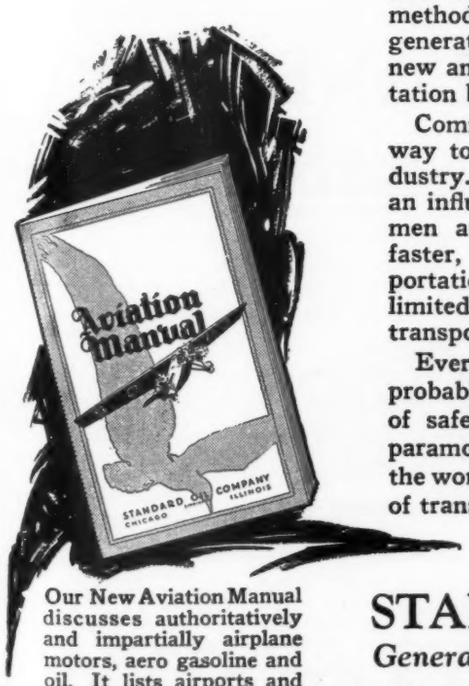
DURING the past generation railway transportation was born and developed to a fast and safe method of travel. . . . The present generation is witnessing the rise of a new and speedier mode of transportation by air.

Commercial aviation is well on its way to becoming a tremendous industry. It is even at this early stage an influence in business. Now, that men are looking into the air for faster, more flexible means of transportation the growth of aviation is limited only by the standards of safe transportation that it can offer.

Everyone connected with aviation probably realizes that the guarantee of safety and dependability are of paramount importance in influencing the world's acceptance of this method of transportation. The Standard Oil Company (Indiana) has long recognized the importance of safety and dependability in air travel, and it realized that in accomplishing safe flying, fuel and lubrication of motors are material factors. When Stanolind Aviation Gasoline, Stanolind and Superla Aero oils were offered to flyers it was with absolute conviction that these products would meet airplane service requirements—a conviction resulting from countless experiments and tests.

With thousands of flying hours to the credit of Stanolind Aviation Gasoline and Aero Oils never has a single engine failure been traceable to faulty combustion or improper lubrication.

At almost any flying station throughout the Middle West you can obtain these Standard Oil Company (Indiana) products.



Our New Aviation Manual discusses authoritatively and impartially airplane motors, aero gasoline and oil. It lists airports and landing fields throughout the middle west. It gives other valuable information to aviators. Write for your copy.

STANDARD OIL COMPANY *(Indiana)*

General Offices: 910 S. Michigan Ave. Chicago, Illinois

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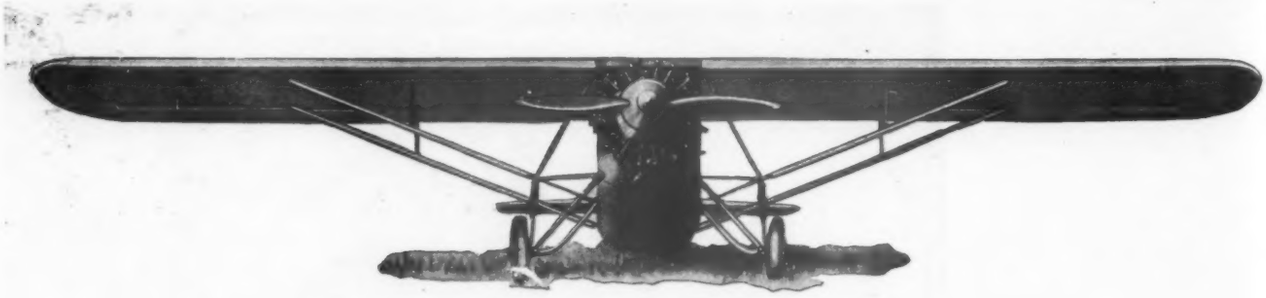
Quincy	Wichita		Saginaw	Milwaukee		
				Green Bay		

310



AIR-KING MONOFOUR

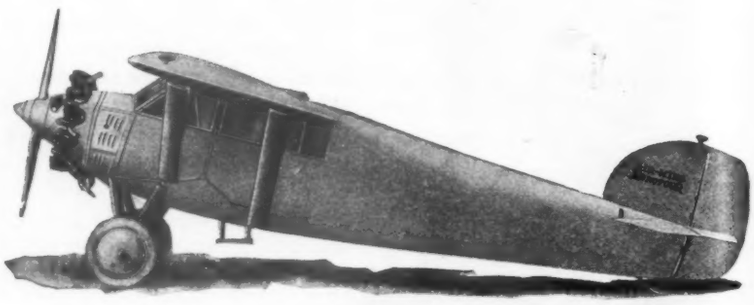
JUST WHAT flyers and business men have been waiting for. A cabin monoplane of superior performance and exceedingly beautiful in appearance.

The Monofour is without doubt the greatest performing new production job on the market. Trim and neat—finished like the most luxurious automobile—the Monofour is writing a new page in Aviation History.

a CABIN MONOPLANE *for* Pilot *and* Three Passengers

Not crowded, or cramped but comfortable and with ample space room (for arms and legs). You'll like the Air-King Monofour—it marks a forward step in cabin jobs.

Orders are now being booked for future delivery. Write for prices and description.



NATIONAL AIRWAYS SYSTEM

FIELD 7 LOMAX ILLINOIS

The Story of the Magic Carpet which flew wherever the owner wished, is one of the most popular of all the Arabian Nights Entertainments.

FREEDOM FROM NEEDLESS WEIGHT IS A MAGIC CARPET

The magic carpet finds its modern parallel in the recent application of Aluminum and its alloys to the science of aviation.

This marvelous metal is helping to bring the airways of the world into the safety zone . . . and has given to the aircraft industry a new and more practical dimension.

Today, thousands of sturdy ships are sailing over land and sea, carrying men and women on errands of business or pleasure, carrying merchandise and mail . . . carrying the pursuit of science and discovery to the remotest parts of the earth.

Carrying them with a safety and comfort undreamed of—even five years ago. For aircraft parts that were previously made of wood—moisture-absorbing, susceptible to warping, inflammable, easily shattered, have been replaced by Aluminum Alloys of measured tempers and toughness. Heavy cast iron parts, with their useless toll of dead weight, have given way to heat-treated Aluminum Alloys—stronger, less than half as heavy.

The widespread use of Aluminum and its alloys in aircraft construction has come with great suddenness.

But behind the rapidity of its actual adoption lie years of patient work—of experimentation and development.

Aluminum Company of America, the world's foremost authority on Aluminum and its alloys, offers you today not only the metal in its various forms but a thorough technical experience in its use.

The strong Aluminum Alloys produced by Aluminum Company of America retain the low specific gravity characteristic of commercially pure Aluminum.

Yet they have tensile strengths ranging from 14,000 lbs. per square inch to 70,000 lbs. per square inch.

The alloys within this range are designated by name and fall within fixed areas of Tensile Strength, Yield Point and Elongation.

The variation in their treatment and temper and their consequent wide range of mechanical properties make it possible for Aluminum Company of America to present an Aluminum Alloy exactly suited for practically every aircraft part.

Complete metallurgical engineering and technical information concerning every form of Aluminum for aircraft, together with its fabricated uses, will be furnished upon request.

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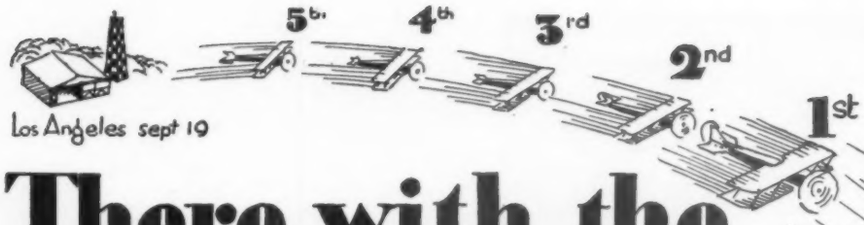

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class A

There with the *first five*-no less

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I want to take this opportunity of again complimenting you on the worth of your splendid "Kendall" oil.

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Pittsburgh, Pa.
October, 1, 1928.

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IN the Los Angeles to Cincinnati Airace of 1928, nineteen planes started in class A from Mines Field on September 19. Nine of them fought their way under highly unfavorable weather conditions to the finish at Lunken Airport, Cincinnati, on September 23rd. The following is the order of finish of the First Five —ALL OF WHOM USED KENDALL PENZBEST OIL THROUGHOUT THE TRIP.

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3rd place
THEO. W. KENYON; *Challenger;* Warner

4th place
S. J. WHITTMAN; *Pheasant;* OX-5

5th place
J. S. CHARLES; *Eaglerock;* OX-5

Pilots who have a habit of winning also have the habit of relying upon Kendall Penzbest Oil for the finest possible lubrication in tests of speed and endurance. Because it is super-refined from the Bradford grade of Pennsylvania Oil—the world's finest grade—Kendall Penzbest has a heavier body at high temperature and a greater fluidity at extremely low temperatures. A change to Kendall Penzbest Oil will lead to increased power and reliability in any airplane engine.

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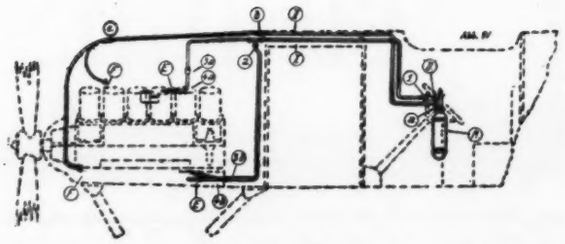

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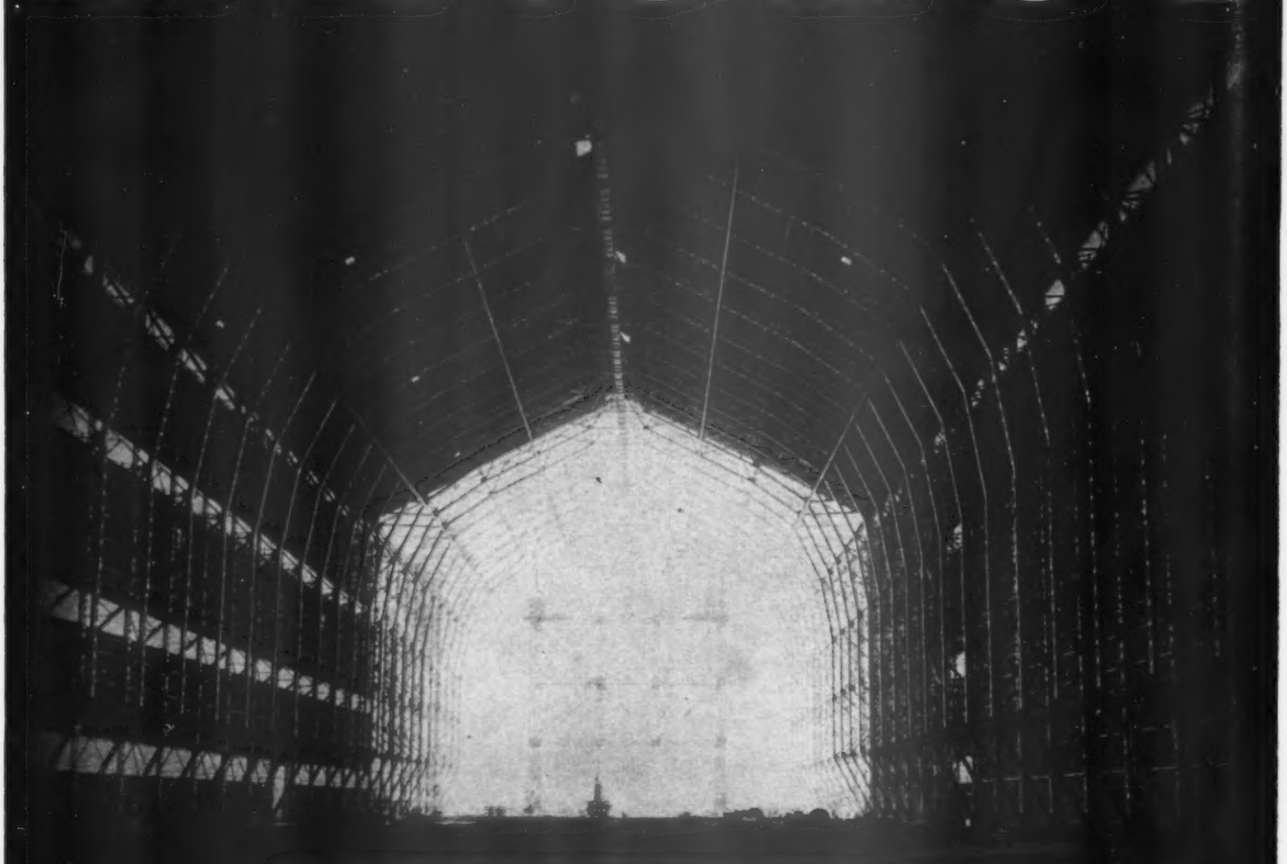

THIS is the interior of the largest air shed in the world. At Karachi, India. Built for the 5-million-cubic-foot ships that will travel the Inter-Empire Air Route from London to Singapore.

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The Oldest American Aeronautical Magazine

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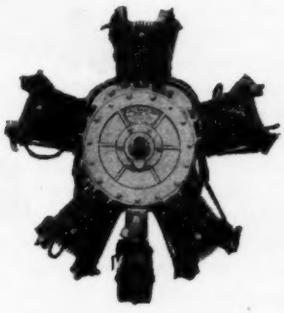

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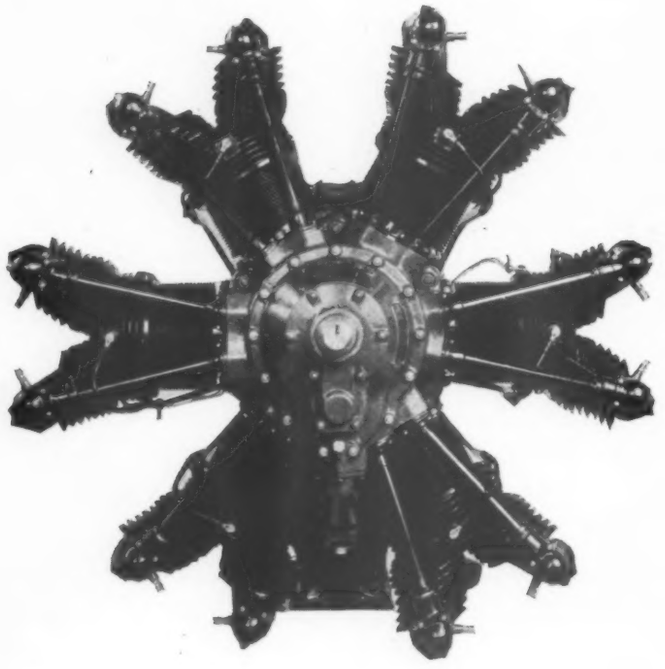

"IT'S a good engine"—That's what our engineering experts promised us when the first Curtiss Challenger engine, all bright and shining, was on the block, ready for its first test run. After one—and two—and three—fifty-hour runs, the smiles of the engineers were a bit broader as they repeated "It's a good engine."

We installed it in a Curtiss "Robin," and flight-tested it for a hundred hours under every condition. The pilots who flew it and the mechanics who serviced it without exception echoed "It's a good engine."

Then Casey Jones flew the Challenger to Los Angeles and back—6,000 miles—averaging 100 miles an hour and 11½ miles to the gallon, with no trouble, repairs, or replacements of any kind. And as he stepped out of the plane at Curtiss Field, he replied to our "Well?" with "It's a good engine."

Finally, the engine was returned to our Engineering Department. They disassembled it, examined every part minutely with precision instruments, found it to be in beautiful condition, and chorused triumphantly, "We told you so—it's a good engine!"

The Challenger develops 170 h.p. at 1800 R.P.M. It is simple in construction, smooth in operation, reliable, and economical. In short—"It's a good engine."

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AVIATION

The Oldest American Aeronautical Magazine

Vol. XXV NOVEMBER 3, 1928 No. 19

There Are Others

A YOUNG lady was recently grounded for 15 days as the result of a self conducted aerial trip under the four bridges that span the East River in New York City. To the best of our knowledge this is the first time that a member of the fair sex has run afoul of the Aeronautics Branch of the Department of Commerce, and it is to be hoped that other young ladies, who are engaged in flying for pleasure alone, will take heed and pilot their planes accordingly. While the young lady's flight required no great amount of daring and even less piloting skill, and was made successfully, there was the chance that it might have ended in a serious accident which would have affected persons not connected with the flight.

Pilots of today are divided into two classes . . . those that fly for pleasure and those that fly for a living. The majority of those that fly for a living are the ones who have worked hard and sacrificed much that aviation might progress to the point where it received the recognition of the world at large and took its place among other industries. The results of those combined efforts are now history, and the going is a bit easier than it was in the days gone by. However, the public is not as yet completely sold on the airplane, nor has it yet been completely educated to the fact that there are two distinct types of flying . . . safe and unsafe. Therefore, an accident, no matter how it caused, has its effect upon the public as regards the safety of aviation as a whole. Those who fly for pleasure alone, both men and women, should be made to realize that there are other pilots who depend upon aviation for a living, and that reckless, foolhardy folly makes their task just that much more difficult.

Pilots for Private Owners

IN the early days of automobiling there were proportionally to the number of cars in use a much larger percentage of chauffeurs than there are today. The reason was that cars were more difficult to drive, that they required much more care, that it was much harder to get supplies and gasoline, and also, that road maps had to be carefully studied, as the system of marking roads had not been developed. Today, exactly the same condition exists in regard to a private plane owner employing a professional pilot, even though he, himself, knows how to fly. Planes today are easier to fly than they were a few years ago, but there is still much progress to be made. Engines may be run for longer periods between overhauls, but if forced landings are to be avoided, the maintenance of the engine must be carefully attended to. There is a constantly growing number of flying fields with proper facilities for servicing and storage, but on any long distance cross-country trip, there will be times when it will be difficult to obtain the proper gasoline and places where planes will have to be tethered down for the night instead of being run into a hangar. Then there is the question of finding one's way. This not only requires considerable experience, but also requires a very considerable amount of advance study of maps, and the plotting of the course, the marking of distances, prominent land marks, getting advance weather reports, etc.

All these things can be done by the private plane owner, if he has had enough experience, and especially if he is willing to take the time and trouble. However, if cross-country flying is to be done as it should be done, but often is not done even by professional pilots, as much time will be spent in advance preparation as in the actual flying. If a private owner is to get the full benefit of his plane on a business trip, he will do so by employing a private pilot. This will not only relieve him from worry, but in case of bad weather, which prohibits flying, he can go on by train and have the pilot follow when the weather clears. The question of cost is, of course, a serious element; but many private pilots who fly their own planes locally will find it well worth while to employ the services of a competent pilot if they expect to take a long cross-country trip. Many private owners fly mostly for sport, but after all, the airplane will be used as is the automobile for convenience and business, and in this respect the employment of a pilot helps greatly and there should be no sense of false shame about employing one. A yachtsman employs a professional captain when he goes on a long cruise, and after all, cross-country flying requires as much experience.

Air Cooled Racers

LAST year at the Spokane races, the air cooled radial engine was a serious contender in a military speed race. Last year, also, one of the British Schneider Cup racers was fitted with an air cooled radial engine. This year at Los Angeles, the Boeing F4B equipped with a Pratt and Whitney "Wasp" made the best time around the course. Though the speed was not quite as high as that made by the Curtiss V-1500 at Spokane last year, neither was the rated horsepower of the Wasp as high as that of the V-1500. Of course, exact comparisons between the speed of planes powered with water and air cooled engines are not possible, as the air cooled engine plane requires a different type of fuselage than the water cooled. It also must be admitted, that more effort has been put into the development of air cooled engines during recent years than has been put into the water cooled. However, it has been proved very definitely that the air cooled radial can be a much more serious contender against the water cooled engine in pure speed events than would seem possible by a glance at their relative frontal areas. Much has been learned during the past few years about the streamlining of radials and about the shape of fuselage which gives the best results for high speeds. It can no longer be said, as it could a few years ago, that water cooled engines must be used for high speed.

Wanted:— Suitable 1929 Air Tour Formula

By JOHN T. NEVILL

WANTED:—SUITABLE formula for scoring commercial airplanes entered in the 1929 National Air Tour!

That small order is the standing plea of the Detroit Board of Commerce, which organization has been staging the National Air Tour for the past four years.

As can be seen by the emphasis, the "catch" in the plea lies in the word "suitable," the idea being to acquire a formula that will satisfy both the manufacturers and pilots of each and every class of craft entered.

The difficulty confronting the Board's aviation committee in the selection of such a formula is obvious after glancing through the pages of AVIATION, or most any other nationally circulated aeronautical trade publication. Who can advance a formula by means of which the performance of all of America's widely varied commercial airplane types can be compared with equal fairness to each of them? What engineer, or group of engineers, will suggest a formula to judge fairly the performance of low-powered and high-powered, single, dual, and trimotored planes, monoplanes, biplanes, and sesquiplanes, single seaters and transports, open and cabin jobs, water-cooled and air-cooled motors, all entered in the same contest and vying for the same prize?

Pilots Hold Meeting After Tour

One of the highly interesting sequels to every year's National Air Tour is the meeting of the pilots who participated in the event. This meeting functions as a clearing house for ideas and complaints, both constructive and destructive, relating to the Tour, its management and operation. The meeting usually culminates with the filing of a petition signed by a majority of the pilots, or all of them, pointing out the faults, suggesting this or that, and praising whoever and whatever, in their opinion, deserves praise.

The scoring formula, being the most important item considered in conducting the Tour, never fails to come in for a generous share of criticism. Although it has been modified several times to conform with some of the suggestions made from time to time, it has never met with the unanimous approval of the pilots. And, in that connection, it can logically be predicted, it probably never will meet with their unanimous approval, no matter what engineering genius comes forward with an all-encompassing formula.

The improbability of every attaining perfection in one formula to cover comparisons of so many varied classes of aircraft is realized by the aircraft events committee of the Detroit Board of Commerce. In the words of William B. Mayo, chief engineer of the Ford Motor Co. and chairman of that committee, the committee merely is "seeking a formula that most nearly fills all the needs for which it is intended." Mr. Mayo, who presided at the pilots' meeting following the recent National Air Tour, made that statement during discussion of the Tour formula.

Mr. Mayo also reiterated the oft repeated expression of the aircraft events committee that the committee is extremely desirous of cooperating with the manufacturers

The 1927 Tour planes on Curtiss Field, Long Island, N. Y. This Tour was won by "Eddie" Stinson in a Stinson-Detroiter monoplane.

and the pilots; is always glad to receive constructive suggestions; and is always ready to substitute a favored formula when that formula has the slightest chance of proving better than the one in force.

The present formula, i.e., that used on the 1928 Tour, is as follows: Load times speed, divided by stick plus unstick, times 50 over the engine displacement equals the score for a leg. As has always been the case, the load, speed, stick and unstick tests were made at Ford Airport before the Tour began. Figures obtained in the tests were never changed, but rather the formula was applied to the individual planes, and, considering the mileage and time element over individual legs, a "perfect score for a leg" or a "figure of merit" was acquired for each entrant.

It can readily be seen then, how important to the winning or losing of the Tour are the pre-Tour tests. This

fact gave rise to the complaint of the pilots that the Tour "is a cut and dried affair, and barring major accidents is won or lost at Ford Airport before the Tour ever begins."

That particular criticism was soundly based. On the recent Tour the highest Figure of Merit was 850.4, that of "Johnny" Wood, pilot of a Waco Ten, who won the Tour. The lowest was that of Dan Robertson, pilot of the Curtiss Robin. Robertson's "perfect score for a leg" was 232.7.

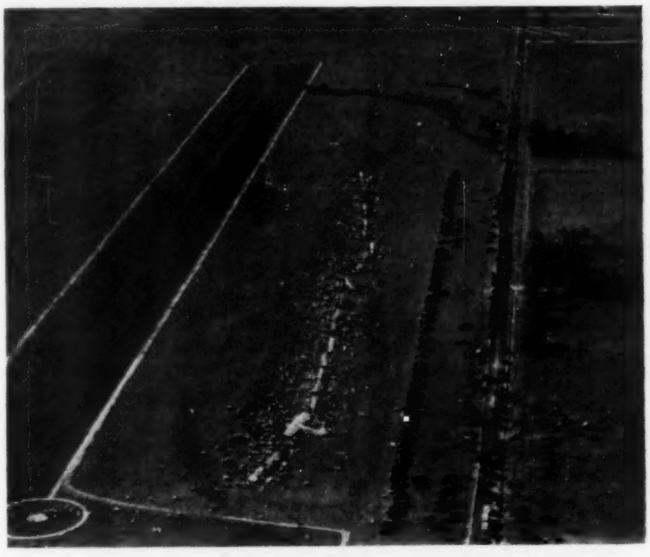
In order to show further the importance of the figure of merit determined in the pre-Tour tests we print the following table, showing the order of finish, the plane, the figure of merit, and the position of the figure of merit according to size. Study the first column as compared with the last. You will note that only six of the 24 entrants finished in any position other than that which their respective figure of merit, alone, would give them.

The table follows:

Position	Plane and No.	Figure of Merit	Size of F. of M.
First	Waco, No. 18	850.4	First
Second	Ford, No. 2	798.3	Second
Third	Stinson, No. 21	752.8	Third
Fourth	Waco, No. 19	718.2	Fourth
Fifth	Stinson, No. 20	673.1	Fifth
Sixth	Stinson, No. 22	630.3	Seventh
Seventh	Ryan, No. 10	646.8	Sixth
Eighth	Bellanca, No. 1	621.4	Eighth
Ninth	Ryan, No. 16	592.4	Ninth } Tied.
Tenth	Buhl, No. 8	592.4	Ninth }
Eleventh	Lockheed, No. 23	575.2	Tenth
Twelfth	Fairchild, No. 24	512.6	Twelfth
Thirteenth	Travel Air, No. 3	522.	Eleventh
Fourteenth	Bellanca, No. 25	482.2	Thirteenth
Fifteenth	Swallow, No. 17	428.5	Fifteenth
Sixteenth	Buhl, No. 7	442.9	Fourteenth
Seventeenth	Stearman, No. 6	396.9	Sixteenth
Eighteenth	Eagle Rock, No. 12	380.	Seventeenth
Nineteenth	Monocupe, No. 29	367.3	Eighteenth
Twentieth	Ryan, No. 9	292.5	Twenty-first
Twenty-first	Waco, No. 28	321.6	Twentieth
Twenty-second	Travel Air, No. 14	361.6	Nineteenth
Twenty-third	Curtiss Robin, No. 5	232.7	Twenty-third
Twenty-fourth	Monocoupe, No. 26	254.	Twenty-second

You will note that after the tie in figure of merit points between numbers 16 and 18 all of the positions in the figure of merit standing are just one notch above what they ordinarily would be had not the tie occurred. In each case where a ship with a lower figure of merit slipped ahead of one with a higher one, the change was due to the pilot with the higher figure suffering more than his share of trouble as compared with very little trouble suffered by the lower figured pilot. Plane number 22 with a figure of merit of 630.3, in seventh place in the figure of merit column went into sixth place at the finish because Plane number 10, holder of sixth place in the figures of merit column, suffered five imperfect legs as against two by Plane number 22. Plane number 24 moved ahead of Plane number 3 because the former was late but three times as compared with six times by the latter. Plane number 17 went ahead of Plane number 7 because Plane number 7 had 6 imperfect scores against one by Plane number 17. Two planes, numbers 9 and 28, moved ahead of Plane number 14 only because Plane number 14 had motor trouble in El Paso that kept it behind the Tour for 11 days.

Therefore, assuming that all of the entrants would have scored perfect scores all around the route, they would have been lined up at the finish exactly accordingly to size of their figure of merit, with the difference between any one ship and its immediate trailer the difference between their respective figures of merit multiplied by 32, the number of legs on the Tour route. Only one ship, in fact, the Stearman, did finish with a perfect record, and that ship came in seventeenth because 15 other planes had figures of merit higher than it had.



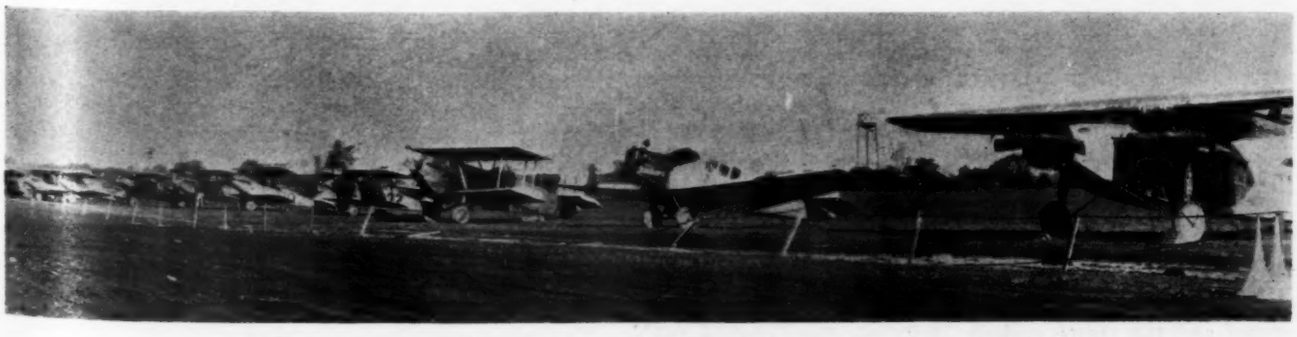
The 1926 Tour planes at Chicago. This Tour was won by Walter Beech in a Travel Air biplane.

Surely, there IS something wrong with a formula that operates like that. The pilots who flew the Tour are not alone in agreeing with that point. The Aircraft Events Committee, of the Detroit Board of Commerce, realizes it, and has tried for years to remedy it. But, who can advance a better one?

With regard to the Tour formula and the Rules and Regulations governing the Tour, Ray Cooper, manager of aircraft events for the Board, had this to say:

"Last year when we were attending the aeronautical congress in Washington we called a meeting of manufacturers with a particular view toward having them cooperate with us in drafting the rules and regulations for the next National Air Tour. An advisory committee was

(*Continued on page* 1444)



A line-up of the entries in the first Ford Reliability Tour held in 1925.

The "Golden Eagle"

New Two Passenger Light Monoplane of the Externally Braced High Wing Type Has a Top Speed of 110 M.P.H.

By CHARLES F. McREYNOLDS

NOW in quantity production, following successful showing of two models in the Los Angeles Aeronautical Exposition, the "Golden Eagle," externally braced, high wing, two place monoplane, manufactured by the R. O. Bone Co., Los Angeles, Calif. promises to make a determined bid for popularity as the leading American lightplane.

Although the two models on exhibition at the recent air show were both single place Anzani powered planes, the standard production job is to be a two place, dual control training and sport plane equipped with the Velie 45 hp. engine. There are five of this type now under construction at the factory, in addition to the two original experimental models which are being test flown at the Master Aircraft field south of Los Angeles. The first five airplanes are now in the assembly stage, material for a second lot of ten airplanes has been received, and it is thought that the factory will be building 20 airplanes a month in a very short time. This production can be increased to five planes a day in the present plant if the demand should warrant such output.

Application for Type Certificate Made

Application is now being made for the Department of Commerce Approved Type Certificate and until this has been granted no distributors or dealers will be signed. In the meantime it is planned to send out the first five production planes to prospective distributors in widely separated parts of the country under experimental licenses in order that they may be thoroughly demonstrated without delay. It is planned to make these demonstrations merciless in order to show the value of the 10 plus safety factor of the Golden Eagle. The climb of better than 850 ft. per min., top speed of at least 110 m.p.h., and landing speed of under 30 m.p.h. should make these various demonstrations most interesting to those in the market for a light airplane The fact that the plane will fly hands off the controls, bank right and left with rudder only, and will return to normal flying position, without oscillation, from a right or left vertical bank will help to make the demonstrations worth while. Much of the Golden Eagle's maneuverability is the result of extra large control surfaces. The horizontal stabilizer and elevators each have an area of 10 sq. ft., giving a total horizontal control surface of 20 sq. ft. at the tail.

Attractive color combinations will feature the Golden Eagle planes and make them easy for the average person to distinguish and recognize. The wing is to be finished in silver, the nose, wheel disks and cockpit cowling in bright orange, and the fuselage orange and yellow with black striping to accentuate the streamlines. The tail will be silver with a Golden Eagle transfer on each side of the rudder. Inside the cockpit all controls will be nickel plated and the entire cockpit, including the Consolidated instrument board panel, is to be upholstered in black leather. Although these colors are standard, the customer may order any desired combination of Berry Bros. lacquer colors without additional cost. Cowling the engine and fitting a spinner to the propeller will also help to accentuate the clean lines of the plane.

The Golden Eagle is a light, two place, externally braced, high wing monoplane weighing approximately 590 lb. empty. Dual controls are standard equipment, with the passenger cockpit in front.

The high wing is of semi-cantilever type braced both internally and externally. Front and rear spars are of straight laminated two piece airplane spruce with diagonal

A flight picture of the "Golden Eagle" monoplane, manufactured by R. O. Bone Co., Los Angeles, Calif.

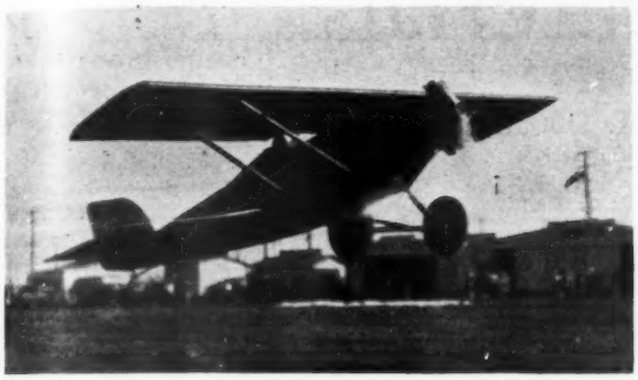
splices coming between the center section fittings. The front spar measures 5 in. deep by 7/8 in. thick. Rear spar is 3 7/8 in. deep and 1 in. thick. The wing is braced to the body by four short center section struts to the upper longerons and by two long struts on each side of the fuselage extending from the lower longeron out to the wing beams. All struts are streamlined with light wood, wrapped and doped, and each pair of struts is cross braced with streamline wire. The long struts are adjustable at the wing beam fitting to provide for rigging. All wing beam fittings are of heavy steel carried completely around the beam with the minimum of bolts passing through the spar.

There are eight compression members 7/8 in. by 2 in. spaced between spars independently of the ribs. Drag bracing is by 10 gauge round wire, double in the center three bays and single wire in the outer two on each side.

The wing curve is a modified Clark Y. By slightly flattening the curve, Mr. Campbell, the designer, has been

able to improve the take off and landing qualities of the Golden Eagle without sacrificing speed. The wing is straight across without taper and has an aspect ratio of six plus. Wing tips are of 3/5 in. chrome molybdenum tubing having a 4½ in. curve and with the upper and lower surfaces equally tapered. Wing span is 28 ft. and chord is 4 ft. 6 in.

The wing ribs are of modified Warren truss structure built up of ¼ in. airplane spruce, gussetted and glued on both sides, and fastened together with cement coated brass



The "Golden Eagle" monoplane taking-off.

nails. All ribs are assembled in cast iron jigs, assuring perfect accuracy and making is possible to build them rapidly.

In assembling the wing the ribs are slipped over the spars and are glued and nailed fast to them. A ¼ in. fillet runs along the tops of the spars to guarantee proper spacing and to provide a point of attachment for the plywood covering on the leading edge. The leading edge consists of a solid spruce member shaped to the true airfoil curve. This is covered with Haskelite two ply to back slightly beyond the rear edge of the front spar. A fillet is also inserted between ribs along the leading edge. The trailing edge is a 20 gauge U-shaped aluminum strip 1½ in. wide which slips over the trailing ends of the ribs and is nailed to them. Wing covering is Flightex, finished with Berry Bros. No. 1 dope.

The ailerons are of wood construction similar to that of the wings and have a total area of 14 sq. ft. They are each hinged to a false spar at three points along the upper edge of the aileron. The false spar is reinforced to the rear spar by an eight in. strip of plywood above and below each point of hinge attachment. Ailerons are operated by flexible wires over pulleys.

The fuselage is of No. 57-180-1A steel tubing formed and welded in a permanent jig to a rigid Warren truss structure. No brace wires are used. All welding is oxy-acetylene. Tubing is Linoil treated inside and covered with red oxide and Berry Bros. gray outside. No rivets are used anywhere in the entire airplane. The main longerons are ¾ in. 20 gauge tubing. The first three forward stations are of ¾ in. 20 gauge tubing also, and from there to the tail post the cross members reduce in size from ⅝ in. to ½ in.

Turtle Deck Faired With Spruce Strips

The turtle deck from pilot's cockpit to the tail is faired with spruce strips over plywood bulkheads. Spruce strip fairing is also used along the mid point of each side and around the cockpits to provide a base of attachment for the aluminum cowling. The entire fuselage is then covered with Flightex fabric except where aluminum cowling is fitted around the cockpits.

The tail surfaces are of welded chrome molybdenum steel tubing fabric covered. Horizontal stabilizer is adjustable three and one-half degrees on the ground and is set at zero for a 150 lb. pilot. It is of one piece construction and is braced to the fin and fuselage by streamline wires at the rear edge, while streamline struts brace the leading edge to the lower fuselage longerons. The flippers are welded to a continuous steel tube mounted to the stabilizer by hinges at four points and operated by a bell crank at the center. A second steel tube is fitted inside the main elevator cross member and pinned through with nickel steel pins at five points as an additional safety factor.

Although the spreader bar type landing gear is standard; divided axle type may be had at slight extra cost. Landing gear thread is 6 ft. 4 in. with the wheel position eight inches in front of the center of gravity. Customary shock cord absorbers are used. The landing gear struts are cross braced with wire and are fastened to the lower longeron fitting with four 5/16 in. nickel steel bolts.

(*Continued on page* 1442)

A side view of one of the single-seater experimental models of the "Golden Eagle" monoplane.

Purchasing *and* Receiving *the* Materials

By EDWIN R. DOUGLAS
Consulting Engineer

THE first article of this series pointed out that the foundation of modern management is exact, centralized knowledge. In the six succeeding articles, we have considered the methods of applying this knowledge to actual production, both through the control of operations performed by labor and the control of the materials.

Both labor and raw materials are commodities which must ordinarily be purchased in the markets. The purchasing of labor is now, in most plants, centralized in an employment department, which can handle it far more satisfactorily than can the individual superintendents and foremen. The purchasing of materials is, for a similar reason, almost universally handled by a purchasing department. At this point, we shall take up the functions of the latter department.

The purchasing department stands between the plant and the outside supplier and must regard its duties from two distinct points of view. One is that of price, terms, and deliveries; the other, that of quantity, quality, utility, and urgency of requirement. These are, however, but two sides of one subject. Neither can be held as of lesser importance, and each must receive full consideration in every purchase. Nevertheless, in many cases, in former years especially, the purchasing agent has considered his duty done when he has bought at the lowest price, without much regard for utility and fitness. Happily, this stage is passing.

Complete Information Necessary

But the purchasing department cannot buy both economically and satisfactorily, unless it knows what the requirements really are. Too often, the purchasing agent has been blamed when the fault lay in the factory itself—in the incomplete knowledge of what was needed and what the market afforded, the hasty judgment of the factory personnel as to requirements, and the failure to specify clearly what was in mind. Here, indeed, is seen the need both of exact knowledge and of full co-operation—knowledge, once more of "What," How," "Where" and "When" and co-operation between those who alone can supply that knowledge and those who must receive and transmit it.

The original information and final decision as to what materials are required must come from the technical division (the departments of engineering and research), and from skilled craftsmen in the shops. This information will be embodied in drawings, or conveyed in memorandums issued by engineering and research departments to the purchasing, stores, and planning departments. It must be clear, exact, complete, unequivocal. In cases of doubt, questions must be referred back to the technical division for settlement. Neither the planning, stores, nor the purchasing department is qualified to pass on such questions.

This information may refer either to materials to be kept as standard stores, or to those to be specially purchased. In the former case, it must be noted either directly on the stores ledger sheets of the materials affected or, if too detailed or too general, placed in a file of standard purchasing specifications, and cross referenced to the stores ledger items affected. In either event, when a new

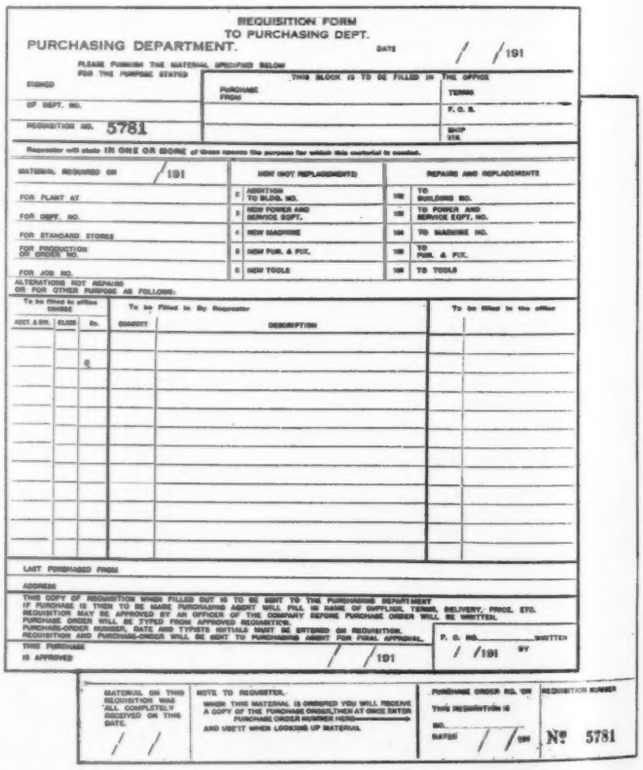

REQUISITION FORM
TO PURCHASING DEPT.
PURCHASING DEPARTMENT.
DATE / /191
PLEASE FURNISH THE MATERIAL SPECIFIED BELOW FOR THE PURPOSE STATED
THIS BLOCK IS TO BE FILLED IN BY THE OFFICE
SIGNED
OF DEPT. NO.
REQUISITION NO. 5781
PURCHASE FROM
TERMS
F. O. B.
SHIP VIA
Requester will check IN ONE OR MORE of these spaces the purpose for which this material is needed.
MATERIAL REQUIRED ON / /191
FOR PLANT AT
FOR DEPT. NO.
FOR STANDARD STORES
FOR PRODUCTION OR ORDER NO.
FOR JOB NO.
ALTERATIONS NOT REPAIRS OR FOR OTHER PURPOSE AS FOLLOWS:
NEW (NOT REPLACEMENTS)
1 ADDITION TO BLDG. NO.
2 NEW POWER AND SERVICE DEPT.
4 NEW MACHINE
5 NEW FUR. & FIX.
6 NEW TOOLS
REPAIRS AND REPLACEMENTS
102 TO BUILDING NO.
103 TO POWER AND SERVICE DEPT. NO.
104 TO MACHINE NO.
105 TO FUR. & FIX.
106 TO TOOLS
To be filled in by Requester
To be filled in the office
ACCT. & DIV. CLASS No. QUANTITY DESCRIPTION
LAST PURCHASED FROM
ADDRESS
THIS COPY OF REQUISITION WHEN FILLED OUT IS TO BE SENT TO THE PURCHASING DEPARTMENT
IF PURCHASE IS THEN TO BE MADE PURCHASING AGENT WILL FILL IN NAME OF SUPPLIER, TERMS, DELIVERY, PRICE, ETC.
REQUISITION MAY BE APPROVED BY AN OFFICER OF THE COMPANY BEFORE PURCHASE ORDER WILL BE WRITTEN.
PURCHASE-ORDER NUMBER, DATE AND TYPISTS INITIALS MUST BE ENTERED ON REQUISITION.
REQUISITION AND PURCHASE-ORDER WILL BE SENT TO PURCHASING AGENT FOR FINAL APPROVAL.
THIS PURCHASE IS APPROVED / /191
P. O. NO. WRITTEN / /191 BY
MATERIAL ON THIS REQUISITION WAS ALL COMPLETELY RECEIVED ON THIS DATE. / /
NOTE TO REQUESTER.
WHEN THIS MATERIAL IS ORDERED YOU WILL RECEIVE A COPY OF THE PURCHASE ORDER,—THEN AT ONCE ENTER PURCHASE ORDER NUMBER HERE——— AND USE IT WHEN LOOKING UP MATERIAL
PURCHASE ORDER NO. 126
THIS REQUISITION IS NO.
DATED / /191
REQUISITION NUMBER
№ 5781

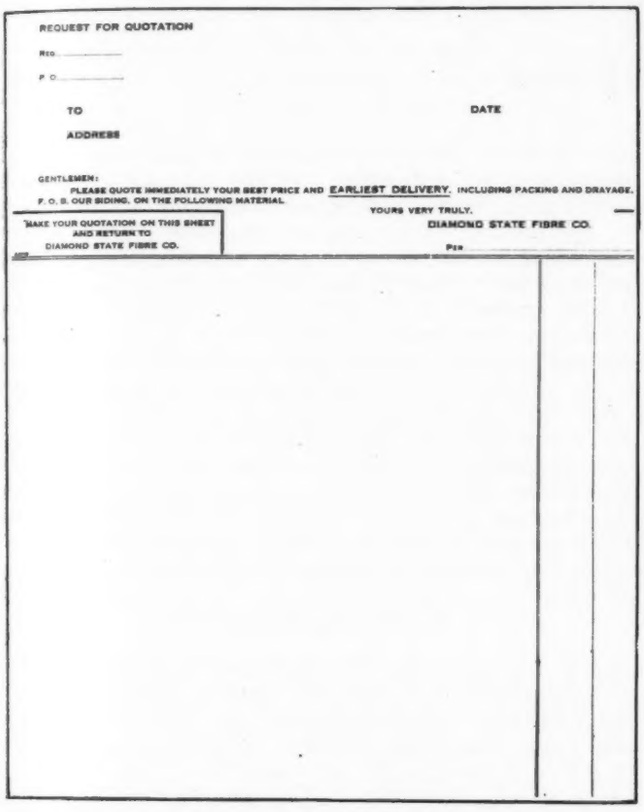
Fig. 1. A requisition form to the purchasing department. Note the spaces provided for showing the purpose for which the material is needed.

supply of these materials is to be ordered, a copy of this information, or these specifications with any necessary blueprints, must accompany the request for purchase.

If the materials are to be specially purchased, the information as to character, and quality will refer to the production order number for which they are required. In this case, the planning department is interested, but the stores department is not, as its records are not affected. Again, a copy of the special information must accompany the request for purchase.

So much, at present, as to What. The next problems are

How Much and When. The source of this information, for standard materials, must be the stores ledger, with its balances and minimums as to quantities on hand, or available, or provided. (This was discussed in the preceding article.) In this ledger, promptly and accurately maintained, the stores clerk is provided with a very efficient instrument for controlling the ordering and supplying of all the items therein recorded. Particularly when the full control form of ledger is used, showing "balances provided," posted in advance from the production specifications (see the third article of this series, which appeared



REQUEST FOR QUOTATION

Req. _____

P. O. _____

TO

ADDRESS

DATE

GENTLEMEN:

PLEASE QUOTE IMMEDIATELY YOUR BEST PRICE AND EARLIEST DELIVERY, INCLUDING PACKING AND DRAYAGE, F. O. B. OUR SIDING, ON THE FOLLOWING MATERIAL.

YOURS VERY TRULY,

DIAMOND STATE FIBRE CO.

By _____

MAKE YOUR QUOTATION ON THIS SHEET AND RETURN TO DIAMOND STATE FIBRE CO.

Fig. 2. A printed "request for quotation" form.

in AVIATION, the issue of August 18, 1928), the stores clerk is in position to supply all standard requirements, with no "hold-ups" and with the very minimums of stock kept on hand and tied-up capital. When, on any article, his ledger shows the balance falling below the set minimum, he is automatically notified to re-order. This answers the When.

The How Much he must determine. This will depend upon the quantity required by the order being newly posted and on the activity of the material as evidenced by recent withdrawals and prospective requirements. Here, the chief stores clerk must confer with the planning, engineering and sales departments to find what the prospects are and, here full co-operation is needed. Such business gossip as passes at daily lunch-club gatherings or weekly production round tables is very enlightening if wisely used, and the chief stores clerk, as well as the production manager, engineers, purchasing agent, and salesmanager, should be included in such conclaves. The question of How Much requires collective thought and collaboration. When it is settled, the chief stores clerk is in position to make a requisition on the purchasing department, stating what and how much he requires and when it should be at hand.

In the case of special materials, the How Much is that quantity called for on the production specification of the order. A copy of this specification, with special materials noted, sent by the planning to the purchasing department, may be all that is required; or, if desired, the planning department may fill out a formal requisition for the special materials.

In some cases the quantity of special material required is so small that it cannot be bought (such as a requirement for a few dozen special tacks or rivets, where a full box is the smallest market commodity). In such cases, the quantity ordered must be increased and the extra material, if kept in the storeroom, becomes an "odd stock" and a nuisance. If not kept in the storeroom, it is left around the shop and lost, or carried home by some thrifty employee. This situation sometimes cannot be avoided, and then the "odd stock" alternative is the better one. But where possible, it is best to order only the quantity of special materials required for the case in hand. Such odd stock as accumulates should be listed, and copies of the list should be issued periodically to the engineering department, repair men, and others who may have occasion to use it. Items which are not used up in a reasonable time, and for which no use seems likely to be found, should be sold or scrapped, so that the list is kept down to reasonable size.

Purchasing Agent Places Orders

Returning to the matter of purchases, all information as to What, How Much and When is now in the hands of the purchasing agent, and it is up to him to determine where he will place the order, depending upon quality, price and delivery offered by suppliers on his list. Sometimes this will have been settled by fixed contracts for the material, against which his purchase orders apply. This is an excellent plan on standard materials used in quantity. Sometimes he knows from recent experience, and without further inquiry, where he can place the order to the best advantage. Often, however, he will need to get quotations from several suppliers. On less important materials, this is almost a matter of routine that can be handled by an intelligent clerk in his department; but on large and important purchases the ability and best efforts of a high-class purchasing agent are none too good. In such cases, much correspondence may be required, with exchange of data, samples and tests, visits from salesmen, and visits of the purchasing agent to other plants. Here, personality, tact, training, and experience count greatly in getting favorable responses; but these are subjects in business psychology beyond the scope of the present discussion.

For handling the inquiries, responses and data secured, there must be systematic methods, forms and filing systems, else the purchasing department will become chaotic.

Twelve Routine Steps

The routine steps to be taken toward the purchase of material, whether standard or special, are as follows:

1. The first formal step is a "Request for Purchase," made out by the chief stores clerk or other authorized person, and sent to the purchasing department.

2. The second step is usually the consulting of a "Purchase Record" and the mailing out to selected suppliers of "Requests for Quotations."

3. The comparison of bids, recording of them on the purchase record, discussion of them with the originator of the request and decision as to which bid shall be accepted.

4. Making out of a purchase order and sending it to the favored supplier, with necessary copies for office use.

5. Receipt of materials, making of "receiving records" and notifications to those interested.

(*Continued on page* 1434)

Airplane Engine Ignition

A Discussion of the Advantages of Both Battery and Magneto Ignition Systems for Airplane Engines

By A. H. PACKER

AVIATION ignition at the present time has reached a state of reliability that is highly gratifying, but the reliability is due to the duplication of equipment as well as to the perfection of that equipment. Perhaps no other factor is more vital to the continuous functioning of the engine than good ignition and there is no other subject of greater significance from a commercial as well as from an engineering point of view.

At present ignition design centers on reliability, but with reliability attained, may there not be some other factor to influence design a few years from now? With increased competition, considerations of cost may creep in. Then there is weight, fire hazard, safety and performance to consider. And behind the whole problem will be the question of basing the design on magneto construction or, with starters and generators becoming more common, on the battery system as the fundamental ignition unit.

The discussion which follows is intended to bring out engineering fundamentals having a bearing on any kind of magneto or battery ignition system and is not intended as a specific reference to any particular make of ignition device. Where fundamental difficulties in any type of system are encountered it is always possible by superior design, materials or workmanship to neutralize their influence. Similarly with a design that is inherently ideal it is possible to sacrifice the natural advantages if the details of construction are slighted in any way.

With reliability to be considered first, the high tension magneto scores a point in being an independent system, needing nothing but wires to the spark plugs to make it work. The battery ignition, on the other hand, requires a battery, a switch with wires and connections for the primary circuit, in addition to its high tension circuits. And in case of corroded switch contacts or burnt switch fingers the result in the case of battery ignition would be to weaken or kill the spark, whereas with the magneto it would only prevent shutting off the engine.

The battery system also has an inherent weakness in depending on the storage battery as a source of primary current, for a short in the wiring might put the battery out of commission, in addition to creating a fire hazard, while the functioning of the ignition on the generator current would depend on maintaining the engine speed above the cut-in point of the generator—usually easy to do, but still an inherent weakness in the system.

From the standpoint of locating trouble on the plane the battery ignition system has the advantage, for the ammeter indication with the switch thrown right or left will show whether normal primary current is flowing, whether points make contact or not and, under certain conditions, will even show whether a condenser is shorted.

Magneto Easily Inspected

The magneto on the other hand cannot be readily tested without removing it from the engine. Inspection, however, will show whether the points are making and breaking. And inspection will show whether the distributor brush is in position or not and whether the distributor block is wet or shorted. With the magneto apparently timed correctly and no evident defect in distributor or interrupter it is desirable to try it with the primary wire to switch disconnected. Then if it does not fire it is usually found necessary to remove it for a test on the bench.

One advantage the battery ignition system always has is that it gives easy starting without auxiliary devices such as booster magnetos, required for easy starting with mag-

(*Continued on page* 1432)

Left—An Exide battery, type 6TX-19. Center—An Eclipse combination hand and electric inertia starter with a Hart Magnetic switch. Right—A Scintilla magneto, type V-AG9-D.

The "Starwing" Monoplane

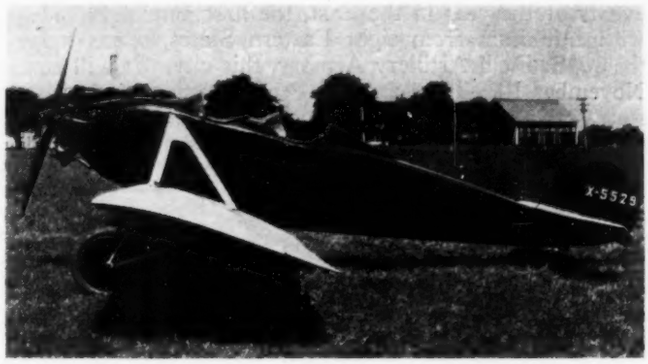
A Two Passenger Externally Braced Low Wing Monoplane Powered With a 60 Hp. Five Cylinder Le Blond Engine

FOLLOWING a series of test flights, production of the "starwing" monoplane is soon to be started by the American Aircraft Corp. of Massillon, O. The plane, which is the result of a year of development, is a two passenger, externally braced, low wing type powered with a five cylinder Le Blond engine, developing 60 hp. at 1800 r.p.m. Several interesting features are embodied in its design.

The Starwing has a span of 29 ft., an overall length of 23 ft. and is 6 ft. 6¾ in. high. The weight empty is 749 lb. and the pay load 180 lb. In the course of the tests the plane attained a high speed of 105 m.p.h. and made a 300 mile trip with an average speed of 94.6 m.p.h. The landing speed is 35 m.p.h.

In conformance with conventional practice the Starwing has a wood wing structure and a fuselage of welded steel tubing. The fuselage is constructed in the form of a Warren truss, tapering toward the tail, well streamlined and presenting a clean appearance. Ample room is provided in both cockpits and the tandem seating arrangement was adopted to afford greater comfort on long cross country flights. Both cockpits are fitted with windshields and a streamline headrest is provided for the pilot in the rear.

Cambered spruce box spars are used with spruce ears glued to plywood webs on both tension and compression flanges. The webs are of diagonal three ply mahogany. Ribs are constructed of spruce battens with three ply mahogany gussets and are very light in weight. Three bays are made in the internal drag bracing of each wing panel with steel tube compression members and double diagonal bracing of hard wire and Macwhyte tie rods. "U" type tubing is used to form the trailing edge. All internal parts are finished with Linoil and grade A fabric is used for covering. The standard doping and finishing process is employed.

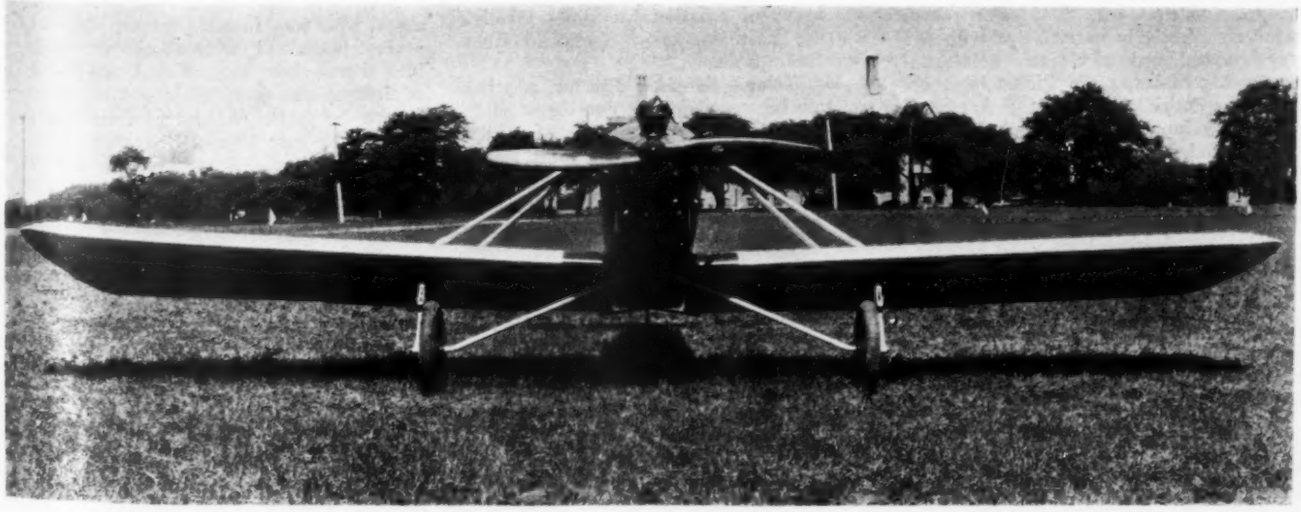


A side view of the Le Blond powered "Starwing" monoplane.

The wing chord is constant throughout the span and tapered in thickness. A specially developed airfoil section is used. Wings are attached to the lower fuselage longerons by means of bolts and are externally braced by inverted vee type compression struts of special design and placed in such a position that it is unnecessary to climb over them in entering either cockpit. The spars are not continuous and are independently attached to the fuselage. The rear spar strut attachment is adjustable to correct for any wing heaviness which might occur through slight warping of wings after the plane is placed in service. Fittings are so designed and placed as to eliminate unbeneficial eccentricities.

The specially designed landing gear has a nine foot tread and regulation 26 x 4 in. wheels. This gear is of the divided axle type, each wheel having one radius member attached to the fuselage and the other to the rear spar of the wing. The shock absorber strut is attached

(*Continued on page* 1430)



A front view of the new "Starwing" monoplane, equipped with a 60 hp. Le Blond engine.

First Annual Philadelphia Aircraft Exposition Opens

Demand for Space So Great That Armory Cannot Accommodate All Exhibits

PHILADELPHIA, PA.—Hailed as one of the outstanding aviation events of the year in the East, the first annual Philadelphia Aircraft Show, with exhibitors from eight Eastern States, opens today (November 3), at the 108th Field Artillery Armory, this city. It will continue until Saturday, November 10. Thousands of Pennsylvanians and visitors from surrounding states are expected when Mayor Harry A. Mackey unlocks the Broad Street entrance of the building and opens the show. Governor John S. Fisher of Pennsylvania, also is scheduled to attend. The seven day exposition was originally expected to comprise 18 planes and be more or less of a local show. It was accepted, however, as a representative Eastern show and 26 planes of various types have now been placed on display by manufacturers, distributors, and dealers in this section.

So intense was the interest that the original space within the armory was sold soon after the show's preliminary announcement and several drastic revisions of space were necessary. One of the late comers, the Stout Metal Airplane Division of the Ford Motor Co., found no space remaining inside the armory and is exhibiting one of its tri-engined Ford monoplanes in a huge tent in the Armory yard. A canvas canopy connects the tent with the main building.

Monocoupe Hung From Dome

Another exhibitor, J. Wesley Smith, president of the Philadelphia Air Transport Co., operator of the Norristown Airport, Norristown, Pa., has relieved the crowded situation by displaying one of his company's Monocoupes on the floor with another suspended from the dome of the Armory.

Adding to the show's appearance, brass posts and blue rope are being used to separate the booths instead of the customary wooden work. The color scheme has been effectively carried out with several thousand yards of blue and gold satine, blue and gold being the Philadelphia colors. The entire ceiling of the Armory is cevered by an elaborate "tent" decoration of blue and gray cloth. All the decorations are arranged so that no part of the Armory structure, no matter how minute, is discernable.

Ray Krimm is Director

Ray Krimm, director of publicity for the Philadelphia Airport and director of the show, announced the following list of exhibitors a few days before the show opened. It is not complete.

Bellanca Aircraft Corp.; Keystone Aircraft Corp.; Pitcairn Aviation, Inc.; Pratt & Whitney Aircraft Co.; Ludington Philadelphia Flying Service, Inc., operator of the Philadelphia Airport; Philadelphia Aircraft Co.; Gettysburg Flying Service, Inc.; Aero Service Corp.; Reading Airplane Co.; Aircraft and Airways of America, Inc.; American Airports Corp.; Scott Aeronautic Co., Ltd.; Crescent Air Service, Inc.; Fircher and Jacobs, Inc.; B. B. T. Corporation of America; Kendall Refining Co.; Airport Equipment Division, Maryland Metal Building Co.; Air Touring Bureau of the Automobile Club of Philadelphia; Parker & Co., aviation insurance; Philadelphia Air Transport Co.; Berliner Aircraft Co., Inc.; Summerill Tubing Co.; United States Aircraft Corp.; Wilson Goggles, Inc.; Rand McNally & Co.; Snap-On Wrench Co.; Tidewater Oil Co.; Vacuum Oil Co.; Simplex Piston Ring Co.; Military Sales Co.; Gaul, Derr and Shearer; Harwen Products Co.; Aviation Committee of the Philadelphia Chamber of Commerce; *The* Aircraft Corp.; Willson Goggles, Inc.; sion Air Service, Pennsylvania National Guard, and the Philadelphia Naval Aircraft Factory.

Several Conferences Scheduled

Several conferences on subjects affecting the industry in this section of the country are scheduled during the show. They are being held in a downtown hotel. One of the most important meetings will deal with aviation insurance. It will be attended by the heads of aviation companies throughout the East, dozens of reservations having been made.

Mr. Krimm, the show director, at a banquet to be staged by the exhibitors on the closing night of the show, Saturday, November 10, will announce plans for the second annual Philadelphia Aircraft Show, to be held in November, 1929. Thirty-five per cent. of the space in the 1929 show has already been reserved by enthusiastic exhibitors at this first show, and this is expected to be increased to more than 50 per cent. before the present show closes.

Parks Lets Building Contracts

ST. LOUIS, MO.—Contracts for the steel work on the new Parks Aircraft factory at Parks Airport have been let, it is reported. The first unit, a one story building, is to be more than 500 ft. long and 120 ft. wide.

Law Case Over Field at Dallas

DALLAS, TEX.—A. C. Garrison, garage owner, has made application for an injunction to restrain the city from expending additional bond money for an auxiliary airport site, contending that a municipality has no legal authority to expend public funds for a field to be used by private individuals or firms for private gain. Of a $400,000 aero bond issue, $350,000 was spent on Love Field. Garrison wishes to stop the expenditure of the remainder on an undeveloped 300-acre site west of the city.

Graf Zeppelin Starts U. S.-Germany Flight

NEW YORK, N. Y.—As we go to press the Graf Zeppelin, commanded by Dr. Hugo Eckener, is making the return flight from Lakehurst, N. J., to Friedrichshafen, Germany. The giant dirigible left Lakehurst at 1:45 A.M., October 29, taking a course slightly south of the Great Circle route and close to the steamship lanes.

Radio messages received from the airship during the first stages of the trip indicate that squalls, fog and rain were encountered. Despite the unfavorable weather conditions the dirigible was making excellent time as a result of a tail wind which at times threatened to become a gale, and its speed was at times greater than 100 m. p. h. A report from Berlin stated that at one time Dr. Eckener was forced to ascend to an altitude of approximately 8,000 ft. to escape fog. Radio communication with the Zeppelin was difficult on account of the adverse atmospheric conditions and in many cases only fragments of messages were received.

Sixty-Four Persons Aboard

Sixty-four persons, including a stowaway who was found after the ship was several hours out, were aboard the dirigible. Forty-eight bags of mail and 341 lb. of freight also were taken aboard shortly before the start. A load of freight is to dropped by parachute at Bremen.

To shorten the time necessary for refueling, a reduced supply of gasoline and fuel gas was taken. The dirigible left the United States without making the proposed tour of the Middle West which had been planned. This trip was cancelled because of unfavorable weather conditions.

Opens Kansas City Display

KANSAS CITY, MO.—A complete line of American Eagle planes is being displayed at an airplane show and sales room recently opened by the American Eagle Aircraft Corp. at 18th and McGee Streets, the heart of "Motor Row."

Non-Stop Record Made by Collyer

Wasp Powered Lockheed Used in Atlantic-Pacific Flight

LOS ANGELES, CALIF.—A new record for non-stop flight between the Atlantic Coast and Pacific was established October 25 when Capt. C. B. D. Collyer landed the Wasp powered Lockheed Vega plane Yankee Doodle at Mines Field. The time for the trip, which began at Roosevelt Field, L. I., October 24, was put at 24 hr. 51 min.—1 hr. 59 min. faster than the first east-west non-stop flight across

Capt. C. B. D. Collyer

the continent completed by Lieutenants Macready and Kelley of the Army in 1923. Harry Tucker, owner of the Yankee Doodle, accompanied Captain Collyer as passenger.

Carried 525 Gallons of Fuel

The plane left Roosevelt Field after a 1,700 ft. run at 4:16:35 P. M. Eastern Standard Time and arrived at Los Angeles next day at 2:08:30 P. M. Pacific Time. The fuel supply carried was 525 gal., of which only enough for about 30 min. more flying remained when the Vega reached Mines Field. In commenting on the flight, Tucker stated that a bad fog was encountered near Belmont, Pa., necessitating circling which cost them about an hour's time, but that the remainder of the flight was a steady drive to the Coast. The average speed was estimated at 150 m.p.h.

This was the third non-stop sea-to-sea flight to be successfully completed. That of Lieutenants Macready and Kelley, who flew a Liberty powered Fokker from Roosevelt Field to San Francisco in May 1923 in 26 hr. 50 min., was the first; the second was Col. Art Goebel's flight August 19-20 from Los Angeles to Curtiss Field, L. I., also made in the Yankee Doodle and with Harry Tucker as passenger. The time for this, the record for the run, was 18 hr. 58 min. Thus the Wasp powered Lockheed Yankee Doodle was flown in two of these three cross-country flights and holds the record in both directions.

Laird Doubles Plant Capacity

CHICAGO, ILL.—The E. M. Laird Airplane Co., Ashburn Field, Chicago, has just put into operation a modern addition to its plant which doubles its capacity. Business booked as a result of Laird planes placing high in the recent Los Angeles exposition races will be taken care of with no production delay in the enlarged plant—which ranks as the largest in value of output of any in the Chicago district.

Zeppelin Fuel Made By Winchester Firm

LOUISVILLE, KY.—Fuel gas for the Graf Zeppelin's return flight to Germany was successfully made by engineers of the Kentucky Oxygen-Hydrogen Co. at Winchester, Ky.

When the United States Navy received a request from Dr. Hugo Eckener, commander of the Zeppelin, to ascertain if the gaseous fuel could be made in this country, the problem was referred to former Lieut. R. W. Bottoms, who, during his service in the Navy, was attached to the department of helium gas explorations and researches. Mr. Bottoms, now chief engineer for the Kentucky Hydrogen-Oxygen Co., began a series of experiments that resulted in the ethane gas fuel.

Ethane gas, made by a fractioning process from natural gas, has a specific gravity of 1.04. The fuel gas is so light that it adds nothing to the load of the ship; when depleted, it does not decrease the load of the Zeppelin, as in the case of other liquid fuels.

The new gas was developed by Mr. Bottoms working in collaboration with Herman Heck, chemical engineer of the Louisville Gas and Electric Co. It was found that a by-product gas from the Louisville Gas and Electric Co.'s Winchester plant contained the ethane gas needed.

New Directors for Fairchild

NEW YORK, N. Y.—At a meeting of the stockholders of the Fairchild Aviation Corp., three new directors were elected to the board. They are William B. Scarborough of New York City, a partner of the brokerage firm, Hitt, Farwell & Co.; Mathew C. Brush, New York City, chairman of the American International Corp.; and G. Herbert Walker, New York City, president of W. A. Harriman Co., Inc.

Cleveland Plant Sold by Martin

Great Lakes Aircraft Gets Manufacturing Rights and Factory

CLEVELAND, O.—Announcement is made here that the Glenn L. Martin Co., which is moving to Baltimore, Md., has sold its plant and all manufacturing equipment located here to Great Lakes Aircraft, Inc. The Martin company has licensed the Great Lakes organization to manufacture planes and spare parts for the Model 74, T4M-1, T3M-2, and SC type planes.

Great Lakes Aircraft, Inc., will continue, therefore, to manufacture at Cleveland, producing for both military and commercial markets. The Martin company, on the other hand, is to move to its new Atlantic Seaboard site on January first. The new plant, with the first unit offering 300,000 sq. ft. of floor space, will be equipped with new machinery. When operating, 2,400 men will be employed, it is said.

New models are to be developed and placed in quantity production, according to official word from the Martin company. While many department heads, assistants, and craftsmen of the company will accompany Glenn L. Martin to the new Baltimore plant, sufficient trained men will remain with the Great Lakes firm to form a nucleus for the new Cleveland organization.

Organization Planned To Set World Records

LOS ANGELES, CALIF.—At the conclusion of their record East-West non-stop flight across the continent, Harry Tucker, Lockheed Yankee Doodle owner, and Capt. C. B. D. Collyer, who piloted the plane in establishing this new mark, announced the plans for an organization with the purpose of setting world flight records. Cooperation of towns and clubs throughout the nation would be sought to finance the various ventures.

Tucker's Wasp powered Yankee Doodle and Collyer's Wasp powered City of New York, which he and John Henry Mears employed in setting a new record for circling the globe a short time ago, would be used for the initial attempts at world marks. The men are quoted as saying they believed more than a score of records could be established with these craft.

The business organization is to be built up through the Aviation Service Corp. of New York, of which Captain Collyer is to be president and Tucker, vice president.

New Mono Aircraft Capital

MOLINE, ILL.—Decision is announced by Mono Aircraft, Inc., this city, to increase its working capital.

"Ace" Monoplane Tested on Coast

To Be Used by Members of Essig Aero Advertising Service

LOS ANGELES, CALIF.—Following a series of test flights the "Ace" monoplane, which was exhibited at the Los Angeles Aeronautical Exposition, will be used by members of the Essig Aero Advertising service in order to provide quicker service to clients. The plane is a two place, low wing type powered with a 125 hp., nine cylinder Siemens engine. It was designed by Fred and Al Essig in cooperation with a group of aeronautical engineers.

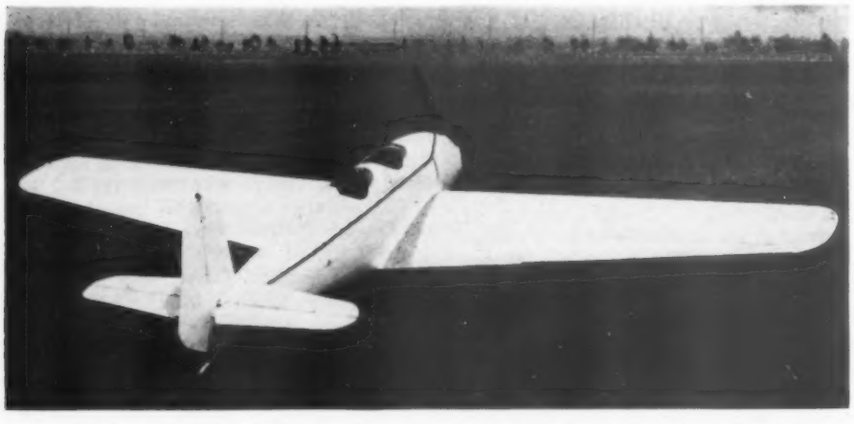
In the tests the Ace attained a maximum speed of 125 m.p.h. It has a cruising speed of 110 m.p.h. and a landing speed of 38 m.p.h. The plane has a wing span of 34 ft., an overall length of 26 ft. and a height of 6 ft. 6 in. The weight empty is 1,200 lb., the pay load 250 lb. and the gross weight 1,700 lb.

Use Dayton-Wright Wing Curve

A Dayton-Wright T1 airfoil section is used in the full cantilever wing which tapers both in plan and in thickness with a maximum chord of 7 ft. at the roots and a minimum chord of 4 ft. at the tips. The main spar is approximately 16 in. thick at the center section and tapers to 4 in. at the tips. Wood construction is employed in the wing which is covered with plywood. Ailerons are similarly built and hinged directly to the upper edge of the rear spar.

Fuselage and tail surfaces are of welded chrome molybdenum steel tubing with plywood covering. The covering is applied over a built up wood fairing from the front cockpit to the tail. This feature increases the rigidity and produces a well streamlined unit. Additional fuselage trussing is provided at the point of attachment of the wing. A divided axle type landing gear, with Gruss Aero Strut shock absorbers, is used. The tail skid is of the spring leaf type.

A complete set of instruments is installed in the pilot's cockpit, which is 2 ft. 2 in. by 2 ft. 9 in. in size and is comfortably upholstered. A 38 gal. gasoline tank is mounted in the nose in such a position that it feeds the engine by gravity. Ailerons are controlled by torque tubes and tail surfaces by steel cables running through micarta pulleys. The entire plane is finished in white with a colored stripe along the upper longeron.



Rear quarter view of "Ace" monoplane built by the Essig Aero Advertising Service for the use of its members.

Plan to Discuss Field Operation

SEATTLE, WASH.—A conference for the purpose of discussing uniform regional airport operation, management, charges and service, etc., is to be held in Seattle some time this month. J. V. Hyde, manager of Boeing Field and vice president of the National Airport Executive Association, is in charge of arrangements for the meeting.

"There are specific problems confronting airport heads in this section which are being solved in a variety of ways," declares Mr. Hyde. "It is very desirable that these methods should be uniform, so that a pilot flying from one field to another or from one state to another may know just what he is expected to do, what his costs will be, and the service he may expect."

Cessna Names New Agents

WICHITA, KAN.—Clyde V. Cessna, president of the company which bears his name, announced the establishment of two important agencies for Cessna planes. One provides for the distribution of Cessnas by the Atlantic Air Service Corp. at New York City, a $100,000 concern. A tentative order of a half dozen planes has been placed. The other agency went to the Watkins Motor Co. at El Paso, Tex. Orders for one Whirlwind-powered and two Warner-engined Cessnas were filed.

Siemens & Halske Names U.S. Agent

Provision Made for Trade to Deal Directly with Manufacturer

NEW YORK, N. Y.—The Siemens & Halske Co., after a visit to this country of the general manager and chief engineer of its airplane engine division, is making arrangements whereby the trade may deal directly with the manufacturer. Arrangements, therefore, have been made by which the business will be handled by Dr. K. G. Frank, consulting engineer and general representative in the United States of the Siemens companies, i. e., Siemens & Halske A. G., Siemens-Schuckertwerke A.G., and associated companies. The K. G. Frank firm is located at 75 West street, New York City.

A friendly arrangement was made with Mr. T. C. Ryan of the Ryan Aeronautical Corp. by which this company no longer handles the exclusive sale of the Siemens engines which, heretofore, have been advertised as "Ryan-Siemens" engines. In the future, these power plants will be known simply as "Siemens Engines," a product of the Siemens & Halske Co. of Germany.

To Have Hanger at Curtiss

The office of Dr. Frank will not only handle the sales but also the servicing of these engines and a Service Station with a complete stock of spare parts has already been established in Hangar No. 33 at Curtiss Field, L. I. Other service stations, at suitable places, are to be established in the near future.

K. G. Frank has taken space in the coming International Aircraft Show to be held at Chicago and an entire line of Siemens engines, including the new large engine which will be brought out on the market some time next year, will be on display.

It is understood that by next year the Siemens & Halske Co. will have a line of airplane engines ranging from 70 to 600 hp. on the market and will thus be in a position to supply an engine for any given purpose.

Mamer Makes Non-Stop Trip

SPOKANE, WASH.—Nick B. Mamer, Spokane pilot, made a non-stop trip from this city to St. Paul on October 24 with Mrs. Clarence Paulsen as a passenger. The 1,173 mi. trip was made in the Buhl Special Airsedan, Whirlwind powered, in 11 hr. 13 min.

En route he dropped messages at the principal airports urging the residents of cities to cooperate with the Spokane Chamber of Commerce in working for a northern air mail route. When Mamer took off he carried about 350 gal. of gasoline.

Fokker Company In Reorganization

Program Calls for Production of Many Types of Planes

NEW YORK, N. Y.—Reorganization of the Fokker Aircraft Corporation of America is announced, with financial interests from all sections of the United States subscribing $4,000,000 to the stock of the company and with a program outlined calling for the production of all types of planes, from the individual sport models to the most costly military equipment. In the reorganization, Anthony H. G. Fokker relinquishes control to a group of industrial leaders who have recently conducted operations in the air transport field.

James A. Talbot, president of the Richfield Oil Co. of California, becomes chairman of the board, and Harris M. Hanshue president and general manager of Western Air Express, becomes president and general manager of the manufacturing concern. Harland B. Tibbets, New York attorney, was named vice president, and H. A. Reid of Los Angeles is secretary-treasurer.

Directors Named

Others on the directorate include John A. Love, St. Louis banker; W. P. Wilson of Wheeling, W. Va.; T. T. C. Gregory, San Francisco corporation attorney; L. H. Piper, of Minneapolis, president of Universal Air Lines, operating several routes in the mid-continent territory and identified with varied interests in the Great Lakes region, G. L. Lewis, New York attorney, and J. Brooks B. Parker, insurance broker of Philadelphia.

In announcing the reorganization of the Fokker Aircraft Corp., Mr. Talbot pointed out the recent trend toward grouping of aeronautical enterprises. While there has been no exchange of stock between the Western Air Express and the Fokker company, Mr. Hanshue will retain the presidency and active management of both companies, it is understood.

Fokker to Retain Interest

Under Mr. Hanshue's management of Fokker Aircraft, Mr. Fokker will retain a substantial stock interest and will devote his entire time to designing and developing new types of aircraft. The burden of directing, production and sales effort will be assumed by Mr. Hanshue, leaving Mr. Fokker free to continue his work.

Mr. Fokker has been an active factor in airplane construction for more than 20 years. At the outbreak of the World War, the young Hollander opened negotiations with various governments, and finally entered an agreement with the German Government under which he produced war-time aircraft for the Central Powers. At the conclusion of the war, he immediately entered the commercial aviation field.

The attraction of new capital to the Fokker organization and the placing of Mr. Hanshue in control of the management mean an immediate expansion in production. The two present plants of the company, at Hasbrouck Heights, N. J., and Wheeling, W. Va., will be enlarged and remodeled to increase production of aircraft types best suited to their capacities. In addition to this, within a short time, the construction of a third plant in California will be undertaken. This new plant will be equipped to produce numerous types of planes, from the sport model through the range of commercial craft. A nation-wide sales organization will be developed to make Fokker products readily available and to render users of Fokker equipment every facility of service.

Air-Sea Globe Tour Planned

NEW YORK, N. Y.—At a recent special meeting in the headquarters of the Fascisti League of North America, Raffale Maiullari announced his intention to race around the world against time by steamship and established air lines for the purpose of stimulating interest in international aerial travel. The start will be made shortly, and Maiullari fully expects to complete the round trip in less than 30 days at a cost of less than $2,000. He will patronize air lines charging regular fare only and will not employ special planes. Mr. Maiullari, who is an active Fascista, will make the long tour entirely at his own expense as a tribute to Premier Mussolini.

Knoll Company Starts To Build First Plane

WICHITA, KAN.—Work on the construction of the first Knoll airplane has started at the factory formerly occupied by the Laird Aircraft Corp., here. The Knoll company has taken a short time lease on the building.

Felix W. A. Knoll, German designer of the new plane, which is of the cabin biplane type, thinks the plane will be ready for the air in time to be exhibited in the Chicago aeronautical exposition in December. Supervising the work with Knoll is his assistant, Hubert Schwenke, also of Germany. Both have had experience in airplane designing.

Parks Lets Building Contracts

ST. LOUIS, MO.—Contracts for the steel work on the new Parks Aircraft factory at Parks Airport have been let, it is reported. The first unit, a one story building, is to be more than 500 ft. long and 120 ft. wide.

Curtiss Sells 27 Planes to Chile

Order of South American Government Amounts to $700,000

GARDEN CITY, L. I.—Frank H. Russell, vice president of the Curtiss Aeroplane Export Corp., states that his company had just sold 18 observation and nine pursuit planes to the Chilean Government. Including spare parts, the transaction involved about $700,000. Mr. Russell said further that this order was but one of several expected in the campaign now under way to divert South American and other foreign plane purchases to the United States.

The demonstration flight by which the Chilean order was won, took the form of an air expedition. Its personnel consisted of C. W. Webster, president of the corporation; Lieut. James H. Doolittle, Army flier detailed on leave for the purpose, and William H. McMullen, Curtiss pilot. Doolittle, who came back to this country a few weeks ago, is now engaged in fog research for the Guggenheim Foundation for the Promotion of Aeronautics. Webster and McMullen have not yet returned.

Flew Curtiss Across Andes

During their ten months in South America, Webster, McMullen and Doolittle flew thousands of miles. In a Curtiss pursuit type, and in a Curtiss observation type, they twice made the difficult crossing of the Andes and gave innumerable demonstrations, sometimes on pontoons, sometimes on wheels, in Chile, Bolivia, Peru, Brazil, Equador, and Argentine. Delivery of the new planes, now under construction in the Curtiss plant at Buffalo, N. Y., is to be made shortly. Two commercial Curtiss-Robin cabin monoplanes have also been purchased for service in South America. One is going to Santiago de Cuba in Chile and another to Buenos Aires. A third Curtiss-Robin is on its way to Sydney, Australia.

Form Second A.A.A. Chapter

DOUGLAS, ARIZ.—The second chapter of the American Aeronautical Association to be formed in Arizona, has been organized here with 25 members and the following officers: Fred D. Hubbell, president; J. P. Sexton, vice president; C. C. McBride, secretary, and J. H. White, treasurer.

Officers of the first Arizona chapter, formed some time ago in Phoenix, are Warren McArthur, Jr., president; W. J. Bemis, vice-president; E. Lewis Irvine, secretary, and D. A. J. McIntyre, treasurer. It has 45 members.

J. Parker Vanzandt, president of Scenic Airways, Inc., is governor of the association for Arizona.

Aviation Country Club Established

Long Island Organization is First of Nationwide Chain

NEW YORK, N. Y.—Completion of the organization of the Long Island Aviation Country Club was announced yesterday by the president, Charles L. Lawrance, head of the Wright Aeronautical Corp. It is the first of the clubs to be established in many cities under the plan of the Aviation Country Clubs, Inc., a plan which follows closely that adopted by the British Air Ministry for the formation of the light flying clubs which have been instrumental in creating civilian interest in England, Australia and Canada.

At a meeting of the board of managers of the Long Island Club, held at the executive offices of Aviation Country Clubs, Inc., 551 Fifth Avenue, Manhattan, Mr. Lawrance was elected president, Edward O. McDonnell, member of the banking firm of B. M. P. Murphy, was chosen as vice president and Chance Vought, president of the Chance Vought Corp., was named secretary and treasurer. This board includes, in addition, Cornelius Vanderbilt Whitney, William Hale Harkness, Henry P. Davison, Reginald L. Brooks, George M. Pynchon, Jr., William B. Leeds, 2nd, Oliver O'Donnell and James B. Taylor, Jr.

To Develop 110 Acre Site

The board also approved the acquisition of a club site of approximately 110 acres located just east of Westbury, L. I., and adjoining the Motor Parkway, and authorized its immediate preparation as a flying field, the erection of the clubhouse and hangars. Property and improvements, when completed, will cost approximately $300,000.

Comd. Richard E. Byrd, Amelia Earhart, Grover Loening, Lieut. Carl B. Eielson, Sherman M. Fairchild, Bernt Balchen, Maj. James Fitzmaurice, Asst. Secretary of Commerce William P. McCracken, Jr., Ruth B. Nichols, Sir George Hubert Wilkins and Asst. Secretary of Navy Edward P. Warner are on the list of members of the Long Island club. Others are William A. Rockefeller, Edward V. Sperry, George H. Townsend, Hon. John H. Trumbull, Darwin J. Adams, Harold O. Barker, Henry Beers, Raymond Bill, Garvin Brackenridge, Norton Conway, Richard E. Croft, James Farnum, Maj. Talbot O. Freeman, Lester Gardner, R. Stewart Kilborne, Bayard L. Kilgour, Jr., John H. Lapham, Robert Law, Jr., Charles T. Ludington Estelle R. Manville, Warren S. Matthews, William Nichols, Alexander Neave, Earl D. Osborn, Roland Palmedo, Charles S. Payson, Sebastian L. Pond, George B. Post, Lewis T. Preston, John S. Reaves, Maj. Gordon Reel, Mrs. Jacob Riis, Richard Roeloff, Garrison H. Silleck, Grant Simmons, Austin L. Smithers, Lorillard Spencer, Alfred Terrell, W. Harris Thurston, Jr., Oscar D. Tuthill, J. C. Willson and Donald Woodward.

On the National Board of Governors of Aviation Country Clubs, the parent corporation, are Charles L. Lawrance, Sherman M. Fairchild, Robert Law, Jr., Geo. B. Post, Earl D. Osborn, James B. Taylor, Jr., and William A. Rockefeller.

The organization work for this nationwide program of flying clubs is under the direction of Mr. John S. Reaves, Darwin J. Adams and Miss Ruth R. Nichols.

Uses Traffic Report Blanks

OKLAHOMA CITY, OKLA.—Special form blanks are used by the Braniff Air Lines, carrying passengers between this city and Tulsa, to check its weekly service. The blank is divided into five main columns headed "Date," "Oklahoma City to Tulsa," "Tulsa to Oklahoma City," "Complimentary Passengers," and "Daily Totals."

Number of trips and number of passengers are listed in the second and third named columns, while complimentary passengers are listed in either direction of travel in the fourth. The weekly total of trips and passengers is given at the bottom of the daily total column. Beneath the form, blanks are provided where the bookkeeper may jot the number of trips scheduled, trips completed, passengers carried according to capacity, the per cent. of scheduled trips completed, and the per cent. of passenger capacity carried.

Nebraska University Giving Aero Course

LINCOLN, NEB.—Aeronautics is now listed as a regular course in the mechanical engineering department of the University of Nebraska. The instructor of the course is Prof. J. W. Haney, who has made a special study of airplane mechanics and flying at a large eastern airplane manufacturing plant.

"The aviation course is not entirely new with the university," Professor Haney said. "We now have six engines, an assortment of instruments, a small Army plane, and three more engines on the way. We expect to get another plane."

Roller-Smith Names Agent

NEW YORK, N. Y.—Arthur H. Abbott, Inc., Boston, Mass., has been appointed New England district sales agent for the Roller-Smith Co., New York City.

Building Plane to Save Expense in Traveling

KANSAS CITY, MO.—A Kansas City chemist is spending $15,000 to effect a great annual saving in time and money.

It costs Dr. Walter M. Cross, an internationally known chemist, $50,000 a year in time and money, he estimates, to travel on trains between his laboratories in New York, Kansas City and Los Angeles, so he is building a specially designed six passenger twin engine monoplane in the factory of the American Eagle Aircraft Corp., here.

It will be powered with two 125 hp. Ryan Siemens engines and will have a wingspan of 47 ft. The plane, it is estimated, will have a high speed of 125 m.p.h., a cruising speed of 110 m.p.h., and a landing speed of approximately 50 m.p.h.

Charles Toth, who has assisted in the preliminary design and structural details, will serve as Dr. Cross's pilot. It is planned to have the plane ready for exhibition in the International Aeronautical Exposition in Chicago in December.

The fuselage of the plane is constructed of welded seamless-steel tubing as are also the tail surfaces and the undercarriage. It will have a split type landing gear and be equipped with Bendix wheels and brakes. Radio equipment will be carried.

Ford to Produce One Transport Plane Daily

DETROIT, MICH.—The Ford Motor Co. plans to enlarge its airplane manufacturing division sufficiently to produce one tri-engined transport daily, according to a recent announcement by officials of that organization.

The company, now building an average of three planes per week, is 30 orders behind. Ten of the 30 tri-engined craft to be built, equipped with Pratt & Whitney Wasps, will be delivered to the Transcontinental Air Transport, Inc. Ten similar planes will go to the Maddux Air Lines, to be used on the extension of their Pacific coast line to El Paso, Tex., and the remainder are to go to the National Air Transport, Inc., and the Stout Air Service.

Ileman Joins Consolidated

NEW YORK, N. Y.—E. A. Ileman, widely known engineer, has become associated with the Consolidated Instrument Co., Inc., New York City, in the capacity of chief engineer, according to an announcement by that company. Mr. Ileman's headquarters will be in New York.

Prior to 1920, Mr. Ileman was chief designing engineer for the Bristol Company, Waterbury, Conn. From 1920 to 1926 he was associated with the American Schaeffer and Budenberg Co., Brooklyn, New York, as engineer in charge of research. During the past two years, Mr. Ileman has been acting in the capacity of consulting engineer for various companies.

Wichita Company Soon To Open School Chain

WICHITA, KAN.—Air Service, Inc., a national network of flying schools with headquarters in Wichita, will be under active operation shortly after November 1, according to E. A. Watkins, president of the new concern and president of the Watkins Manufacturing Co. of Wichita, with branches in more than a score of cities in the United States and Canada.

The corporation will have schools in Wichita, Minneapolis and St. Paul, and in other cities to be selected later. It is chartered under the laws of Kansas and is incorporated for $100,000.

Associated with Mr. Watkins is C. E. Parr, Wichita business man, and Norman G. Warsinske, head of the present air service organization at St. Paul and Minneapolis. Plans have been made for a hangar building capable of housing seven planes here. It will be 62 by 100 ft. Mr. Warshinske will come to Wichita to make his home. With him will be H. A. McDonald, chief pilot; A. P. McCullough, in charge of class work, and A. L. Yielder, maintenance superintendent. As soon as the Wichita school is established sites will be chosen for others.

General Electric Plans To Exhibit New Light

LOUISVILLE, KY.—The General Electric Co. plans to exhibit a new type of light for night flying at Bowman Field, the Louisville airport. This new light, which is known as the airport twin flood light, throws a beam at an angle of approximately 80 deg. and covers an area of 2,650 ft., it is said.

Test landings with the new lighting system will be made by Lieut. James A. Ellison, commander of the Military Post at Bowman Field. Army officers attached to this post and members of the Air Board will be present at this demonstration.

It is understood that the board will order installation of such lights if the demonstration proves satisfactory. Boundary lights will also be included in the contract. With this equipment Bowman Field will be on a night flying basis.

Bradway Made Head Of Air Service Corp.

OKLAHOMA CITY, OKLA.—Air Service Corp., Oklahoma distributors of the Monocoupe, has elected Lee B. Bradway, Oklahoma City contractor, as president of the company. Bradway became majority stockholder in the company through a deal in which he purchased the stock of H. W. Parker, former head of the firm.

J. R. Green, attorney, stockholder in the company since organization, is made field manager in charge of sales. He will be in charge of the downtown office of the company.

Begins Tests on Plane Parachute

LOS ANGELES, CALIF.—Heard McClellan, famous parachute jumper, has begun five tests of his full-sized airplane parachute, in the vicinity of Los Angeles. Mr. McClellan has leased 15 sq. mi. of the General Petroleum Co.'s land southwest of Los Angeles, and hopes to prove conclusively that his great parachute, more than 80 ft. across, can safely lower a full sized airplane and occupants to the ground.

Schinzinger Records Recognized by F.A.I.

WASHINGTON, D. C.—Official notice that the altitude records of Reginald Schinzinger have been homologated has been received by the National Aeronautic Association from the Federation Aeronautique Internationale. The records follow:

Class A—Airplanes with pay load of 500 kg. (1102 lb.) Altitude, Germany, Reginald Schinzinger, Junkers W-34, Bristol Jupiter VII, 420 hp., at Dessau, Sept. 14, 1928. Record—9190 meters (30,150 ft.) Former mark—Lieut. H. R. Harris, U. S. Air Service, U.S.A. TP-1, Liberty 400 hp., at McCook Field, Dayton, O., May 21, 1924. Record—8,578 meters (28,143 ft.)

Class C—Airplanes with pay load of 1000 kg. (2204 lb.) Altitude, Germany, Reginald Schinzinger, Junkers W-34, Bristol Jupiter VII, 420 hp., at Dessau, Sept. 14, 1928. Record—7907 meters (25,941 ft.) Former mark—Herman Steindorff, Germany, Rohrbach-Roland, three BMW's 230 hp. each, at Staaken, Aug. 12, 1927. Record—6805 meters. (22,326 ft.)

Seek Springfield Plant Site

SPRINGFIELD, ILL.—Orval M. Hootens and George Wilie, who are building an enclosed four passenger plane for commercial use and expect to have it completed by the first of the year, have interested the North Side Improvement Association with the prospect that their venture may develop into an airplane factory in that section of the city. The committee is now active with the builders in selecting and establishing a field for the enterprise.

Lady Heath Due November 8

NEW YORK, N. Y.—Lady Heath, British aviatrix who recently established a light plane altitude record of 24,700 ft., will arrive in this country November 8 to begin her tour of the nation in her Gypsy powered Moth plane, according to officials of the Moth Aircraft Corp., New York City.

Newspaper Men Get Aero Course

Cincinnati Scribes Receive Brief Training at Lunken

CINCINNATI, O.—Nine Cincinnati newspapermen recently attended a special short course in aviation at Lunken Airport here. The course was arranged by T. Higbee Embry, president of the Embry-Riddle Co., while Charles E. Planck, in charge of public relations, was manager. The course consisted of lectures by Don Griffith, hangar superintendent; Robert Rockwell, head of the flying school; Embry and Planck. Reporters, city editors and copy readers who handle aviation news on the four daily newspapers were invited to attend.

Planes in various stages of repair and construction at the hangars were shown the scribes. Engines, fuselages, landing gears, wing curves, and all the paraphernalia common to the flier and strange to the layman, were explained and exhibited.

The second part of the course consisted of flying demnstrations by Maj. Robert L. Rockwell in a Waco 10, doing a series of pre-arranged maneuvers, while Embry and Planck explained each one. These maneuvers consisted mainly of those stunts which usually precede accidents, such as the chendelle, spin, vertical bank, stall, etc. Rockwell also demonstrated good and bad landings, bouncing his wheels, leveling off too high, pancaking, ground looping, etc.

Flight Demonstration Included

Genuine approval of the plan was given by the newspapermen, who agreed that the school had proved helpful to them in handling local aviation news. Planck has prepared a dictionary of aviation terms which appears frequently in local and wire news. The definitions are in non-technical language designed to assist the newspaper copy reader in writing headlines, and in correcting accounts submitted by uninformed reporters.

The nine men were guests of Embry in an aerial luncheon in a Stinson, Fairchild, and Waco, after the course was completed.

Consolidated Has Laboratory

NEW YORK, N. Y.—Consolidated Instrument Company of America, Inc., 41 East 42nd Street, New York City, announces the establishment of a completely equipped laboratory in connection with New York headquarters. In this laboratory equipment has been installed for the thorough examination and testing of consolidated airplane and marine instruments. Additional plans are under way for a progressive expansion of Consolidated's activities.

Rankin Company To Build Planes

Plan Factory for Low Wing Monoplane Production

PORTLAND, ORE.—Plans for construction of an airplane factory with an initial capacity of six low-wing monoplanes a day have been announced by J. Kegerreis, president of Rankin System, Inc., of Portland. The site for the plant has not yet been chosen but it will be in Oregon near Portland, he said. About 200 acres will be leased or purchased for the plant which will include a factory and test field. Original investment will be about $175,000.

Building of the factory will be started in January and the company hopes to start actual manufacture by the middle of February, Mr. Kegerreis said.

Rankin System, Inc., was organized several months ago to exploit the Kankin system of flying instruction which originated in the Rankin School of Flying at Portland. Contracts covering the use of the system have been signed, it is said, by 13 western concerns and one in New York, representing more than 27 schools. The contracts for the service make the various organized distributors of the forthcoming plane, thus giving the company a ready-made dealer organization.

Lieutenant Smith Is Designer

Lieut. Basil B. Smith, engineer for the company, is the designer of the plane which will be especially intended for training and sport use.

Two models are projected—a two and a three-place plane. It is planned to use Le Blond engines. The smaller model will develop about 100 m.p.h. and the larger about 110 m.p.h., using the 60 and 90 hp. engines, respectively. Designs call for the larger plane to be convertible from open to closed type. The change may be made in the air, Mr. Kegerreis said. Cost of the smaller plane will be under $2,500. The two-place model will have a wing spread of 37 ft. 1 inch and a length overall of 25 ft. 6 in. It will have a cruising radius of about five and one-half hours. Pay load for the smaller model will be about 350 lbs. and for the larger 500 lbs.

Other Officers Named

Besides Mr. Kegerreis, the officers of the company are P. B. Smith, vice-president; Chase Garfield, treasurer; John M. Hickson, treasurer, and E. S. Goodin, James Houlihan, and George E. Love, directors.

Organizations which have contracted to use the Rankin system of instruction as well as to be distributors of the new plane are:

Hobi Airways Co., Eugene, Ore.; Sanders Aeronautics School, Inc., Medford, Ore.; Commercial Air Transport, Everett, Wash.; Coast Air Lines, Seattle, Wash.; Tacoma Airways, Tacoma, Wash.; Grays Harbor Airways, Aberdeen, Wash.; Mamer Flying Service, Spokane, Wash.; Walla Walla Airways, Walla Walla, Wash.

Sprott-Shaw Schools of Aviation, Vancouver, B. C., which plans schools in several British Columbia cities; Associated Aircraft Co., Hollywood, Calif., with branch schools at San Diego, Riverside, Los Angeles, San Francisco, Oakland, Sacramento, and Bakersfield, Calif.; California National Airways, Fresno, Calif., with branch schools in Modesto, San Jose, Santa Cruz, and Palo Alto, Calif.; Eddie Martin's Airport, Santa Ana, Calif.; Aeronautical Service Corp., Salt Lake City, and Boise Homesite, Inc., Syracuse, N. Y., with branches in Utica and Ithaca.

Crawford Has Larger Factory

VENICE, CALIF.—Rapidly increasing aircraft business on the Pacific Coast has resulted in the expansion of the Crawford Airplane Supply Co. of Venice, Calif. The new plant has a total floor area of 45,000 sq. ft., and contains a complete stock of parts in which are listed more than 1,200 distinct items with a total value of more than $400,000. The new stock room has at least 1,000 ft. of new steel shelving installed in the most modern steel adjustable shelves and bins.

Iowa Firm Building Experimental Plane

CLARINDA, IA.—Announcement is made here by the Dunn Manufacturing Co., maker of automotive, electric, telephone, and radio equipment, that an experimental plane is now under construction in the firm's plant. It is to be the forerunner of a standard production plane to be built shortly.

The craft is to be a three place cabin monoplane employing a high lift wing of 37 ft. span and five foot chord, using a U.S.A. 35A airfoil. Spars and ribs will be of spruce and the fuselage of welded tubing. The power plant will be optional, it is said, ranging from 70 to 100 hp. Weight empty is estimated at 800 lbs. and loaded 1,600 lbs. Harold L. White of Chicago is handling the engineering.

Set New Altitude Mark

WASHINGTON, D. C.—Official calibration of the barometers carried by Capt. St. Clair Streett and Capt. Albert W. Stevens in a flight at Wright Field, Dayton, O., October 10, shows that they climbed to a height of 37,854 ft., setting a new record for a plane carrying two men and coming within 564 ft. of Lieut. C. C. Champion's world mark of 38,418 ft. The mark will not be recognized by the F.A.I., which has no category for altitude marks with two men carried.

Establish First Evans Glider Club in Detroit

DETROIT, MICH.—Club No. 1 of the Evans Glider Clubs of America has been organized by eight young men, employees of the Aircraft Development Corp. at Grosse Isle, according to an announcement by Donald F. Walker, manager of the Evans organization. These men are constructing a simple primary glider of German design, following blue prints furnished by the Evans group.

A group, to be known as Club No. 2, will shortly be organized in San Francisco, Calif., by Mr. Ferguson, connected with the Army in the latter city. Club No. 13 of Portland, Ore., was actually the second to organize, but, because 13 members formed the charter roll, this club desired to take "No. 13" for its designation. Club No. 2, therefore, will actually be the third group.

With glider plans and literature received from Germany, the work of popularizing the sport and carrying on organization is progressing rapidly. Gliders, Inc., recently formed here, will shortly be marketing engineless planes to the many enthusiasts.

Pollak Plans Purchase Of Two Jersey Firms

KEARNY, N. J.—New capital is now being raised by the Pollak Manufacturing Co., Inc., of this city to be used for acquisition of the equipment and business of the Progress Sheet Metal Works of New Jersey and the Universal Machine Products Co. of New Jersey. The Pollak company manufactures airplane parts and equipment. Airplane oil and fuel tanks, landing and navigation lights, and exhaust manifolds for air cooled engines are among its chief products.

Manufacturing facilities will be increased with the addition of the new capital, thus enabling greater production. The company's plant, located here, is a three-story building of 24,000 sq. ft. floor space. Leo L. Pollak is president, C. Schlessinger, vice president, and P. Calabro, secretary-treasurer.

Lueder Stationed at Anglum

ST. LOUIS, MO.—Karl F. Lueder, purchasing agent of the Mahoney-Ryan Aircraft Corp., here at Anglum, and of the B. F. Mahoney Aircraft Corp., San Diego, Calif., now makes his headquarters at Anglum. Communications, quotations, and other matters pertaining to purchases, should be addressed directly to Mr. Lueder, the company states.

Official Show Hotel Named

CHICAGO, ILL.—The Stevens Hotel here has been designated as the official hotel for the International Aeronautical Exposition to be held here December 1-9.

Report Incorporation Of Several Firms

Incorporation of several new aeronautical companies have been recently announced. They are as follows:

WALLA WALLA, WASH.—Walla Walla Airways, Inc., capital $25,000; incorporators, Clause I. Henline, Floyd O. Henline, Winton L. Coogins; to conduct school and air service.

LOS ANGELES, CALIF.—Willrich Aviation Co.; incorporators, E. G. Willrich, George H. Stoddard, Charles M. Crawford, J. Murray Morgan, and Alvin W. Norton, all of Los Angeles.

LOS ANGELES, CALIF.—Lincoln Airlines, capital $50,000, by H. Glenn Hills, H. E. Renaud, R. B. Curtis, H. F. Helsig, and C. A. Burrows, Jr., all of Los Angeles.

LONG BEACH, CALIF.—Ebrite Aero Corp., capital $75,000, by A. R. Ebrite, W. W. O'Kane, and Albert Brain of Long Beach and C. M. Rood of Huntington Beach.

CHARLESTON, W. V.—O. E. Royal, Inc., capital $25,000, by O. E. Royal, J. C. Hall, and others.

CORVALLIS, ORE. — Oregon Airways, Inc., capital $10,000, by Eugene D. Walters, W. J. Chamberlin, and A. D. Johnson, for conducting an aviation school.

To Use 10 Planes in New P.A.A. Service

NEW YORK, N. Y.—Announcement is made by J. M. Eaton, general traffic manager of Pan American Airways, Inc., that a fleet of 10 planes—eight tri-engined monoplanes and two amphibians—will be operated in the New York-Havana air-rail service planned to begin the first of the year.

Fares from New York to Havana by air-rail service will be but $25.66 higher than the regular rail and steamer fare, it is stated, and yet an extra business day will be saved in both directions. The Atlantic Coast Line Railroad and the Florida East Coast Railway are the two services banded with Pan American in the new system.

Tickets will be put on sale at the offices of the rail companies, Pan American Airways, Inc., Thos. Cook & Son, and the American Railway Express Co. They will be obtainable at all the principal cities in the country.

U.S. Airways to Use Fokkers

KANSAS CITY, MO.—Four Fokker Super-Universal monoplanes, powered with Pratt & Whitney engines and with a passenger capacity of six, will go into service on the Kansas City-Denver air passenger-freight line January 1. Announcement of the date for establishing the service and the equipment to be used was made by C. G. Michener, vice president and treasurer of the U. S. Airways, Inc., the company which will operate the line.

Air Ambulance Saves Woman

BUFFALO, N. Y.—The aerial ambulance service recently established by William T. Lyman, traffic manager of Colonial Western Airways, has been successfully put into operation. A Buffalo woman, taken ill while visiting in Rochester, was flown back to this city for treatment by her physician. Doctors declared later that the service aided in saving the woman's life.

Joseph Kreutzer Corp. Names New Personnel

LOS ANGELES, CALIF.—Following reorganization and financing of the Joseph Kreutzer Corp., Los Angeles, a complete list of the personnel has been announced. Joseph Kreutzer remains as president of his firm, which now has both an automotive and aeromotive branch.

The aeromotive division of the Kreutzer firm is operating under the direction of A. J. Edwards, vice president and general manager, formerly with Mahoney and Prudden and now a member of the executive committee of the Aircraft Manufacturer's Association and also serving on the show committee of the Aeronautical Chamber of Commerce.

Chief pilot instructor in the flying school is Henry H. Ogden, around-the-world flier and having more than 3,600 flying hours to his credit. Ground School is under the direction of Lieut. Comdr. Arthur F. White, graduate of Annapolis in 1911 and a naval pilot since that time. Edward Donahue is to be factory superintendent of the Kreutzer aircraft works and Albin K. Peterson, formerly with the Zenith Aircraft Corp., has been named chief engineer in charge of aircraft designing.

Firm Formed to Build New Type of Aircraft

CINCINNATI, O.—Announcement has been made here of the formation of the American Gyropter Co., with temporary offices at Blue Ash, a suburb of Cincinnati. Plans are being made by the company to manufacture a new type of aircraft said to be similar to the de la Cierva Autogyro and designed by E. F. Marsh of Toronto, Canada.

According to Charles W. Lay, consulting aeronautical engineer and one of the directors of the new company, a type of fuselage different from that of the de la Cierva craft will be used. Lay also stated that two machines were to be built, one with a 200 hp. and the other with a 50 hp. engine.

Other directors besides Lay and Marsh are A. H. Stickle of Toronto and W. B. Warner and Harry Heasel of Cincinnati.

Boeing Expansion Program Assured

Two Firms Included in Newly Formed Holding Company

SEATTLE, WASH.—Though it is not definitely known at this writing whether W. E. Boeing will head the newly formed holding company, the Boeing Airplane and Transport Corp., it is stated that a $5,000,000 to $10,000,000 program of expansion within a period of 18 months is assured the Boening interests through an arrangement with the National City Co. of New York. The details of the new program, however, have not as yet been worked out, according to the official statements.

The two Boeing firms which form the new corporation in the reorganization are the Boeing Airplane Co. and the Boeing Air Transport Co. Directors of the new corporation will include J. P. Ripley, vice president of the National City Co.; F. B. Rentschler, president of the Pratt & Whitney Aircraft Co., Hartford, Conn.; C. K. Knickerbocker, vice president of the Griffin Wheel Co., Chicago, Ill.; K. R. Kingsbury, president of the Standard Oil Co. of California; Gurney E. Newlin of Newlin and Ashburn, Los Angeles, Calif.; and Chance Vought, of the Chance Vought Corp., New York.

Supreme Propeller Names Sales Agents

WICHITA, KAN.—The Supreme Propeller Co. here has recently appointed the following sales distributors: Wichita Falls Air Transport Co., Wichita Falls, Tex.; San Antonio Aviation & Motor Co., San Antonio, Tex.; Travel Air Ways, Dallas, Tex.; McIntyre Airport Tulsa, Okla.; Oklahoma Air Transport, Oklahoma City, Oklahoma City, Okla.; Robertson Aircraft Corp., St. Louis, Mo.

Aircraft manufacturing companies now using Supreme Propellers, are as follows: Lincoln Aircraft Co., Lincoln, Neb.; Travel Air Manufacturing Co., Wichita, Kan.; Swallow Airplane Co., Wichita, Kan.; Alexander Aircraft Corp., Colorado Springs, Colo.; Spartan Aircraft Co., Tulsa, Okla.; Velie Motors Co., Moline, Ill.; Swift Aircraft Co., Wichita, Kan.

Four Travel Airs for Parks

Four new OX-5 Travel Airs have been ordered by Parks Air College from the manufacturing company at Wichita, Harry P. Mammen, president of the college announces. The planes will be added to the instruction fleet bringing the number of Travel Air planes in use at the school to 18.

Reviews

The Book Department, Aviation, 250 West 57th St., New York City, can supply all books mentioned except government publications. N.A.C.A. publications may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

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National Advisory Committee for Aeronautics Technical Note No. 293

The Formation of Ice Upon Exposed Parts of an Airplane in Flight. By Thomas Carroll and William H. McAvoy, Langley Memorial Laboratory.

The results of tests by the N.A.C.A. on a VE-7 biplane under conditions favorable to the formation of ice, as well as experience with other types of planes, especially DH-4's in the air mail service are given. These include the types of ice formations observed and the probable causes and suggestions for remedying these conditions. It stated that it is believed that the conditions are ideal for the formation of ice when the airplane encounters rain or heavy fog at a temperature slightly less than 32° F. At these temperatures, the ice seems to build up on parts of the airplane, destroying their original profile, increasing the resistance and decreasing the lift as well as adding to the weight of the plane. At temperatures 10° F. or more below 32° F. the ice formations appear to differ, resulting in more streamline formations.

Suggestions for methods for the combatting of ice formation are discussed and it is concluded that when these conditions must be encountered, that if it is possible to rise to a higher, colder altitude they may be avoided almost as well as by descending to a lower, warmer altitude.

* * *

Practical Flying is the title of a book by Maj. Byron Q. Jones, Army Air Corps, who was the chief of army aviation training in the World War. This book is intended as a training manual for airplane pilots, and it answers many of the innumerable questions usually asked by persons interested in aviation. The first ten chapters deal with the human element in flying. This is a general discussion. The remainder of the book is devoted to more detailed information, with much of the material arranged in question and answer form. It is believed that this portion of the book may be an aid to the student pilot. The price of the volume is $3.00.

* * *

Aerial Bombardment and the International Regulation of Warfare by M. W. Moyse, Ph.D. This book is a treatise of the legal aspects of aerial warfare. In it, the author discusses the regulation of military interests, the prohibiting of aerial bombardment at the first Hague conference, the second Hague conference and aerial warfare, the international regulation of warfare, and the rules of bombardment. The study is closed with a chapter on the "present status of aerial bombardment." The price of the book is $4.00.

Swift Firm in New Quarters

WICHITA, KAN.—The Swift Airplane Company, manufacturing two-place biplanes, has moved into its new factory, purchased recently from the Quick Motor Co. The factory, only recently completed, is located at the new municipal airport.

The Swift Company last week installed a Warner engine in the small, biplane which was the third Swift turned out at the Wichita factory. The Swift was built originally for the Quick engine, a converted LeRhone power plant, but decision to discontinue local development work on the LeRhone engines, caused officials of the Swift Company to look for other makes. The Warner was selected for the light biplane.

Continental Planning To Produce Engines

DETROIT, MICH.—Production is expected to start early in 1929 on the first aircraft engine development of the Continental Motors Corp., according to a recent announcement made by Robert Insley, chief engineer of the aeronautical division of that company. The engine, which is now under development, is a seven cylinder air cooled radial type rated at 150 hp. The engine will have a bore of 4⅝ in. and an equal stroke. It is expected to develop considerably more than the rated horsepower at the normal speed of 2000 r.p.m.

Planes also call for the development of five and nine cylinder engines of the same type, having parts interchangeable with the other engine. A thorough study is also being made of the possibilities in other types of engines and research development of the single sleeve valve for aircraft engines is still underway.

Six Flying Schools Now in Kansas City

KANSAS CITY, MO.—There are now six flying schools in Kansas City with a combined student body of 231. These schools are turning out more than 500 graduates a year. The figures were announced by Robert M. Burtt, chief of the Kansas City Chamber of Commerce aviation bureau, in a recent radio address.

Mr. Burtt also pointed out that 22 concerns now are in the aviation business in Kansas City with nearly 400 persons employed and a payroll of almost $1,000,000 a year. One million dollars also is invested in the business while one firm has an output that exceeds that amount annually. He estimated that there would be more than 5,000 licensed pilots in the Kansas City territory by the end of this year.

Trade Tips

It has been reported that—

—Charles I. Reid, 250 W. 57th Street, New York City, is in the market for a three place plane to be used in keeping speaking and concert engagements.

—The Aeronautical Chamber of Commerce is in receipt of an inquiry from J. W. McKenzie, Fall River, Mass., who desires to buy a two or three place open cockpit plane with air cooled engine of 120 hp., or more, to cost not over $5,000.

—Bids will shortly be taken by the Alliance Aircraft Corp., Alliance, O., for the construction of a one-story 60 by 300 ft. factory building.

—Prices and data on airplane hangars and airport equipment are desired by the Jacksonville, Tex., chamber of commerce.

—Construction of a hangar is planned at the Tulsa Municipal Airport, Tulsa, Okla. W. G. Skelly, the Skelly Building, Tulsa, is manager.

—Erection of a hangar at the municipal airport, Benton Field, has been voted by the city council of Redding, Calif. The structure is to be large enough to house six planes and is estimated to cost $3,500.

—The Bach Aircraft Co. is soon to let a contract for the construction of a 100 by 200 ft. factory building and a 50 by 65 ft. paint shop at its airplane plant, Metropolitan Airport, near Van Nuys, Calif. The improvements, it is estimated, will cost about $30,000.

—A one-story 50 by 117 ft. addition to its factory building is planned by the Pacific Aero Motive Corp., 3417 Angeles Mesa Drive, Los Angeles, Calif.

—Business men of Parks Falls, Wis., are considering the establishment of an airport at that city. The Commercial Club, and other groups, will probably take definite action on the project shortly.

—Hangars and other facilities are to be installed on the Binghamton, N. Y., airport, just selected at West Endicott, in Spring. Establishment was made possible through action of the Endicott Johnson Shoe Manufacturing Corp. officials.

Named Ohio Firm Agent

LOS ANGELES, CALIF.—The Balboni & Walter Airplane Co. of this city has been named Pacific Coast sales representative of the Ohio Aero Manufacturing Corp. of Youngstown, O., Airmaster plane builder. Dealers will shortly be appointed by the Balboni & Walter firm, which has placed an order with the Ohio company for 15 planes for fall delivery.

AIRPORTS AND AIRLINES

New Company to Operate New York-Chicago Service

Eight Hour Flying Schedule Will Be Maintained With Wasp Powered Ford Monoplanes

CHICAGO, ILL.—Formation of the New York, Chicago and Pacific Airways Co. for the establishment of regular air passenger service between Chicago and New York by way of Toledo and Cleveland is reported here The firm, which will have an authorized capital of $5,000,000, has headquarters at 29 S. La Salle Street. Service on the Chicago-New York route is planned to start as soon as the first two Wasp powered Ford Stout tri-engined monoplanes can be obtained. An eight hour schedule will be followed, although it is expected that the planes will make the flight in less than seven as compared with 20 hr. service by rail. While primarily the company is organized to operate over this route, it is planned eventually to extend air passenger lines into many other cities.

Planes will leave New York and Chicago at 12 noon daily; at Cleveland the air liners will connect with the Stout service plane for Detroit. The Newark Metropolitan Airport will be the eastern terminus, while the Chicago Municipal Airport will serve at the western end until establishment of the lake front field near the Loop. Fare will be $100 per passenger. It is declared further that sleeper planes will be operated following completion of radio beacon equipment along the route.

Officers Named

Officers of the company as chosen to date include the following: president and general manager, M. V. Little, formerly assistant traffic manager of National Air Transport; vice-president, W. J. Simpson, of the LaSalle Street financial house of Victor H. Holland & Co.; secretary and treasurer, G. C. Burd, also of Victor H. Holland & Co.; mechanical superintendent, Leland B. Firman, formerly connected with the mechanical department of National Air Transport, and executive chief mechanic of Civil Air Corps.; division traffic manager, William M. North, formerly traffic agent of National Air Transport; auditor, Edward N. Lee, formerly assistant secretary-treasurer of National Air Transport; division traffic manager, C. S. Boyles, formerly traffic agent of National Air Transport at Ft. Worth, Tex., and editor of the *Highland Park Press*, Dallas, Tex.

Ample Traffic Assured

The assurance of ample passenger travel by air over this eastern route is given by inquiries received by the consolidated air transport ticket office in the Palmer House which reports that it receives more requests for air passage to New York than to all other cities combined. During one week the actual count showed 64 requests for air transportation to New York.

The New York, Chicago and Pacific Airways' planes will be ventilated and heated in the winter, will be soundproofed against the engine noises, and will be equipped with a radio receiver and a set of headphones will be provided for each passenger. There also will be newspapers and periodicals aboard and lavatory conveniences will be provided in each plane. A buffet meal will be served enroute. Radio service also will be available, as an engine expert, who will fly as alternate pilot, will act as radio operator and transmit messages from the passengers to the ground. All employees will be uniformed. Card tables also will be provided aboard.

Combination Services Available

One of the most important advantages of the new service will be the time saving available to anyone living within 500 mi. of Chicago. For instance, through a combination of air and rail service, a passenger may leave Omaha, St. Louis, Kansas City, St. Paul, or other cities situated an overnight train journey from Chicago, in the evening and arrive in Chicago the next morning in time to board the eastbound plane leaving at noon. Westbound, one may transact business in New York during the morning, leave on the westbound plane at noon and arrive in Chicago the same evening, in time to catch a train for his home city, arriving there the next morning in time for business.

Carries 1000 in Two Weeks

DALLAS, TEX.—In the past two weeks nearly 1,000 passengers have been carried for 15 min. trips over the city by the tri-engined Ford monoplane owned by Rapid Air Lines, Rapid City, N. D.

Air Mail Saves Interest Money

CHICAGO, ILL.—Much saving by banking houses is credited to the air mail service, in a statement issued here by the National Air Transport, Inc., quoting figures of the Federal Reserve Bank, New York City. For example, checks are sent by air mail to Chicago for clearing, and the represented money is idle but a day, whereas, by the former ordinary mail methods, two days were lost. Figuring in four per cent. interest, a total of $19,255.82 was saved over the Cleveland-Chicago and Atlanta-Birmingham-New Orleans routes, according to statistics from April to July on the former run and from May to July on the latter.

Bronte Making Pacific Coast Airports Survey

LOS ANGELES, CALIF.—Emory Bronte, navigator on the first civilian flight to Hawaii, reports that he is now engaged in making a survey of all Pacific Coast airports for the aviation department of the Associated Oil Co. Bronte is head of the Associated company's aviation department and is making the present trip in a dual control Wasp powered Boeing mail plane of the four passenger type such as is in use on the Los Angeles to Seattle mail route. Others in the survey party with Bronte are Lieut. R. A. Gardner, pilot; H. K. Rothe, flying mechanic; and Beverly G. Brown, petroleum engineer. About six weeks will be spent in an exhaustive examination into the airport accommodations offered at all Pacific Coast points.

Firm Gets Wilmington Hangar

WILMINGTON, DEL.—A hangar has been secured at Wilmington Airport, Bellanca Field, by the Delaware Flying Service, Inc., which operates two Waco planes. Officers of the group, which is newly organized, are J. Allison Buck, president; Jack White, vice president and treasurer; and James R. Morford, secretary and counsel.

Service Firm for Oakland

OAKLAND, CALIF.—The Auto Maintenance Supply Co. has leased space at the Oakland Municipal Airport and will specialize in the washing and servicing of planes.

Chicago to Have New A-1-A Field

To Provide Northern Terminus for Interstate Air Lines

CHICAGO, ILL.—A new A-1-A landing field lying near Chicago's wealthy North Shore suburbs will be equipped next spring to accommodate the many aviation enthusiasts of that region, as well as to be the northern terminus of the Interstate Air Service.

A 130 acre tract has been purchased four miles west of Glencoe, and the field, to be named "Sky Harbor," is being organized by Lawrence W. Scudder of Lake Forest, who states that other backers of the port include a score of wealthy private fliers.

A feature of the field, lying 22 miles northwest of the Loop, will be 20 min. taxi service to the Chicago Municipal Airport, lying about 15 miles southwest of the Loop. This, it is expected, will lead to greater use of the lines leaving the Municipal Airport, as much of the traffic is drawn from the North Shore, whose automobiles cannot negotiate the distance in less than two hours.

If the Chicago lake front air port is built, "Sky Harbor" is expected to become a "commuters'" station enabling North Shore fliers to reach the Chicago business district in 12 to 15 min. flying time and only about 30 min. elapsed time from home to office.

Intermediate Fields Regulations Issued

WASHINGTON, D. C.—Regulations covering the use of Department of Commerce intermediate landing fields have been issued here. "Intermediate landing fields," says the statement, "are established under the authority of the Air Commerce Act to provide for the safety of the aeronautical public in cases of emergencies, and no exclusive rights, preferential privileges, or commercialization of any emergency landing field will be permitted, and the landing field shall not be used in any manner inconsistent with the Air Commerce Act."

Following the listing of the regular rules pertaining to the use of an airport, are statements of facilities offered. A caretaker will be provided at each field, a beacon and boundary lighting system shall be operated from sunset to dawn, a limited supply of gasoline and oil shall be provided, and weather reports and telephone service will be available.

Universal Names Despatcher

MINNEAPOLIS, MINN.— W. B. Haviland has been appointed despatcher for all planes of the Universal Air Lines System operating from Wold-Chamberlain Field here.

Install Compass Table at Oakland

OAKLAND, CALIF.—A commercial compass swing table, designed by Capt. W. D. Vootmeyer, aeronautical navigation expert, has been installed at the Oakland Airport. The table, consisting of a flat disc 75 ft. in diameter, has been placed in a remote corner of the field in order to eliminate any possibility of local magnetic interference.

T.A.T. Plans to Make Winslow, Ariz., a Stop

WINSLOW, ARIZ.—Maj. T. G. Lamphier, vice president of the Transcontinental Air Transport Co., met with the city council here recently and informed them of the intention of his company to locate one of its regular stops here if the city would furnish a suitable airport site, level and surface it, and lay out runways. The company, he said, would provide lights for the field and hangars for its own planes.

The plans of the company include four planes daily, two in each direction, on a route which will include as regular stations, Columbus, Wichita, Dodge City, Las Vegas, Albuquerque, Winslow and Kingman, Barstow and Los Angeles. Emergency landing fields will be arranged for every 25 mi.

A suitable permanent airport site has been selected, and work will be well under way before this issue of AVIATION goes to press.

Make Missouri River Survey

KANSAS CITY, MO.—Beacon Airways, Inc., of this city is making an aerial survey of the Missouri River north from Kansas City to Sioux City, Ia., and east to St. Louis, for the Aerial Photographic Co. of Chicago. A Cessna monoplane, remodeled to hold the aerial camera, is being used for the work.

Howard Jones is piloting the plane. The photographs will all be made from an approximate altitude of 14,000 ft.

Glens Falls Has Airport

GLENS FALLS, N. Y.—Floyd Bennett Airport constituting 100 acres of land has been established at Glens Falls. The field contains a hangar with all necessary mechanical facilities. A licensed pilot is employed.

Albany Made Airport of Entry

ALBANY, N. Y.—With the establishment of this city as a stop on the New York-Montreal air line, Albany has been designated by the Treasury Department as an airport of entry for customs purposes.

Detroit-Chicago Line New Stout Offering

CHICAGO, ILL.—Chicago was scheduled to be linked to Detroit by a daily passenger air line on November 1, according to an announcement by the Stout Air Service, Detroit. The company has opened passenger booking offices in the new Bankers Building in the heart of Chicago's Loop, with Lucius Lobdell as resident manager.

Buses operated by Stout Air Service will connect the Loop with the terminal at the outlying Municipal Airport. The Detroit terminal will be Ford Airport at Dearborn. Fourteen place tri-engined Ford all metal planes will be used, rendering a service modeled after the popular Detroit-Cleveland passenger line.

The schedule on the new division calls for one plane a day from each city to take off at 2 P.M. every day except Sunday. Flying time is 2 hr. 50 min. and the fare is $30 one way, and $50 for the round trip. Bus transportation between the respective airports and downtown is included in the passage and each passenger is allowed 20 lb. of baggage.

The new line practically parallels the Michigan Central Railroad, passing over Ypsilanti, Ann Arbor, Jackson, Battle Creek, Kalamazoo, Niles, Michigan City, Gary and Hammond. Besides newspapers and other reading matter the planes carry a "flight engineer," who points out spots of interest and answer aeronautical questions.

Set Ottumwa Opening Date

OTTUMA, IA.—The dedication of the Ottumwa Airport Corp.'s new field will be the principal feature at the Armistice Day celebration, here, November 10-12, under the auspices of the local post of the American Legion. A fleet of planes from Chanute Field, Rantoul, Ill., will arrive the opening day for the three-day event and a number of commercial planes from this vicinity will be visitors at the port. Special arrangements are being made for the illumination of the field around which the Armistice celebration will center.

More Service for Texas Line

OKLAHOMA CITY, OKLA.—The new Amarillo-Oklahoma City air line, operated by the Amarillo Airport Corp., has proved such a success that daily service may soon supplant the twice weekly schedule now followed, H. W. English, company official, announces.

Watertown to Have Airport

WATERTOWN, N. Y.—Watertown is soon to have an airport available for use of both land and seaplanes. A site has been purchased on Black River Bay near the city and work of development will start at once.

Interstate Line Starts Service November 10

CHICAGO, ILL.—Interstate Air Lines, Inc., plans to begin its mail, freight, and passenger service on November 10, according to an announcement by P. J. Thibodeaux, company treasurer. The flights will be between Chicago and Evansville, Ind., until about December 1, when final arrangements for fields over the entire route to Atlanta, Ga., are completed. The company will begin with a fleet of Fairchild Wasp-engined planes.

The company also intends to sell airplanes at the various stations along the line of flight, and it will also engage in service work. An aero chain store system will result. Added to this, flying lessons will be given, and sightseeing and taxi work will be undertaken. It is said that the corporation is preparing to sell planes on the deferred payment plan if it proves feasible.

The officers of the company are Lawrence W. Scudder, president; C. T. Blackburn, vice president and general manager; Robert T. Sherman, secretary; P. J. Tribodeaux, treasurer; Earl F. Ward, operations manager.

New Company to Start Seattle-Spokane Line

SEATTLE, WASH.—A new daily air service from Seattle to Spokane, with a stop each way at Pasco will be put into effect as soon as planes are delivered, according to announcement just made by L. E. Erickson, president of the Floyd Air Service. Two Ford planes will be ordered, he stated, and delivery is expected next February.

Mr. Erickson stated that his company is incorporated for $300,000 and will start with an initial expenditure of not less than $100,000. He plans, in addition to the Seattle-Pasco-Spokane, a service to Glacier National Park during the summer months. Other officers in this company are Joseph H. Griffin, vice president and George A. Wiswell and T. E. Durland, directors.

Capitol Starts New Line

LOUISVILLE, KY.—Capitol Airways, Inc., of Indianapolis, has begun an Indianapolis-West Baden-Louisville air passenger service. Carl H. Jose, brother of Elmer H. Jose, Capitol company president, is local representative of the line. Bowman Field, Louisville's airport in Seneca Park, is the terminal point.

Meet Opens Algona Field

ALGONA, IA.—A score of airplanes from all parts of the state and with a trio of Army planes from Fort Riley, Kan., participated October 24 in the ceremonies incident to the dedication of the new airport west of the city. Three thousand witnessed the air maneuvers.

Bulletins Ready For Distribution

WASHINGTON, D. C.—Seventeen new airway bulletins have been published here and are now ready for distribution, it is reported by Aeronautics Branch. They are: 438, Cassoday, Kan.; 439, Winfield, Kan.; 440, Shamokin, Pa.; 441, Lowell, Mass.; 442, Carthage, Mo.; 443, Sharon, Pa.; 444, Livingston, Mont.; 445, Monroe, La.; 446, El Reno, Okla.; 447, Jefferson, Ga.; 448, Joplin, Mo.; 449, San Antonio, Tex.; 450, Palo Alto, Calif.; 451, Portland, Me.; 452, Elsinore, Calif.; 453, Lima, O.; 454, Alliance, O.

Chicago Firm Plans Line to New Orleans

CHICAGO, ILL.—Another passenger air line from Chicago, with New Orleans as the terminus, is announced for the near future by W. R. Williamson, president of Central Airways of Chicago. Only the arrangement for adequate landing facilities in New Orleans is required for the launching of this service with all metal tri-engined planes.

Mr. Williamson is now in New Orleans completing negotiations. Flight over this line includes stops at St. Louis, Memphis, Tenn., and Jackson, Miss. Scheduled flying time is put at 11 hr.

To Open Connellsville Field

CONNELLSVILLE, P.—A new airport is to be dedicated here on November 10. Arrangements for the ceremonies and various events are now underway.

Michigan Field Operators Unite

Form Association to Promote and Protect Interests

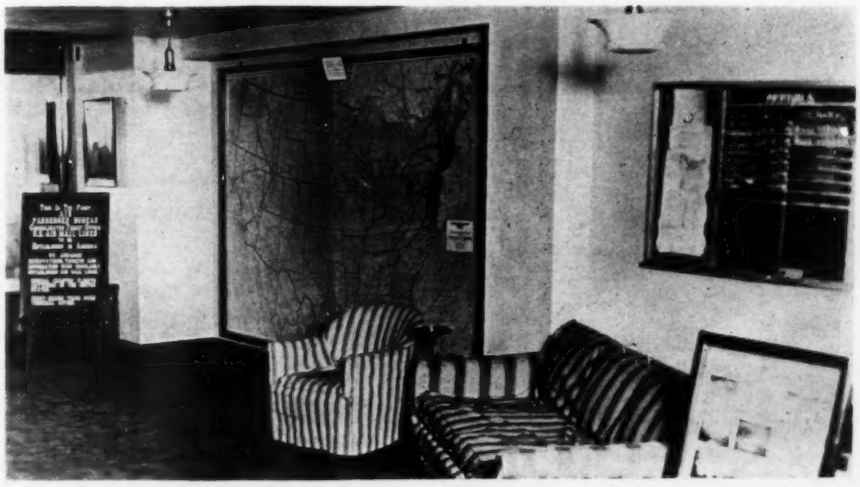
DETROIT, MICH.—Organization of the "Associated Commercial Airmen of Michigan," whose purpose it will be "to promote public confidence in and acceptance of the safety of aviation activities as conducted in the varied activities of associated members," was announced here recently by Guy Burns, president of the association. Burns is owner and operator of the Burns Airport, Detroit. Operators of five additional Detroit and Michigan flying fields were charter members of the organization.

Other purposes of the association, Burns said, are: "To create a standard code of conduct to govern the dealings of associated members in their public relations; to curb the growth of disastrous price cutting in passenger flight, air taxi rates, and fees for air schools and pilot training; and to promote a greater patronage of member airways through an associated advertising program."

Those eligible for membership in the organization include owners of licensed aircraft operating commercially; transport, limited commercial, and industrial pilots of aircraft operating commercially; and licensed mechanics employed by any company.

Beside Burns, other officers of the association are: Ivan C. Kay, partner in the Triangle Flying Service, Detroit, vice president, and Miss Alice Gorham, of Royal Oak, secretary and treasurer.

Chicago's Aero Ticket Bureau



A section of the consolidated ticket office in the Palmer House, Chicago, showing the large Rand McNally Airway map and the blackboard for chalking flights.

FOREIGN ACTIVITIES

Brazilian State Plans To Encourage Flying

SAO PAULO, BAZIL—For the encouragement of air transportation, the State of Matto Grosso, Brazil, will spend the equivalent of $24,000 a year, it is reported here. Corumba, Matto Grosso, lying at the Bolivian border, may be reached by air from Sao Paulo in 12 hours of flying. Landing fields along the route have been provided by the State of Sao Paulo, and Matto Grosso now plans fields and other aids.

Law No. 992, approved a short time ago by the legislature, provides for a school of aviation in the Forca Publica. The law's provisions follow.

Article 1—Authorization of the Forca Publica school, open to both men of the military service and civilians. Article 2—Construction of fields at Cuyaba, Pocene, Caceres, Corumba, Rio Manso, Santa Rita do Araguaya, Coxin, Campo Grande, Rio Pardo, Tres Lagoas, Santa Anna do Paranahyba and Aquidauana, and a prize offer of $2,400 for the first Brazilian pilot to fly over the capital of the state. Article 3—Government assistance to the Lloyd Aereo Brasilerio under condition that it establish regular trips between Sao Paulo and Matto Grosso for transportation of mail and passengers. Article 4—Government establishment of necessary credit not exceeding $24,000 each fiscal year.

Montreal Mast

The new British dirigible R-100 will moor at this new mast at St. Hubert Airdrome, Montreal, which is to be a British Empire airship line terminal.

Cairo to Have Large Airport

CAIRO, EGYPT—A huge airport is planned here by the Government on a tract of land containing 2,100,000 square meters (approximately 189,000 sq. ft.), according to reports. Aviation is making progress in Egypt, with students being sent to Europe to study flying and with a commission drafting general laws to govern the country's aeronautics.

Dominion Club Sets Fees

VANCOUVER, BRITISH COLUMBIA.—Membership fees in the Aero Club of British Columbia were recently fixed at the following rates at a well attended meeting of the club held in the Hotel Grosvenor: entrance fees, $25; annual dues, $10; dual instruction, $16 an hour; solo instruction until qualified, $10 an hour; and solo after receiving ticket, $8 an hour.

De Pinedo Heads General Staff

ROME, ITALY—Gen. Francisco de Pinedo, known for his distance flights and for having twice crossed the Atlantic by air, has been named head of the Italian aeronautical general staff. He takes the place of Gen. Armando Armani, who was obliged to resign his position because of ill health.

Aero League Gives Lectures

ST. JOHN, NEW BRUNSWICK.—Previous to the flying to be carried on when the season starts in 1929, the Aviation League of Canada is giving a series of ground school lectures.

World Conference for Spain

SEVILLE, SPAIN—An international aeronautical conference is planned here for March 12, 1929. An aero exposition will be given in connection with the meeting.

Increase Shown in Austrian Air Travel

VIENNA, AUSTRIA—For the first six months of the present year, passenger air travel in Austria exceeded every other form of commercial aircraft operation, according to figures issued by the publicity bureau of this city. Passengers carried in this period exceed the total for the entire year 1927.

Following is a record of aero traffic in Austria for three years: 1926—1,817 flights with 3,275 passengers and 71,949 kg. of baggage; 1927—3,394 flights with 9,070 passengers and 173,163 kg. of baggage; 1928—January to June inclusive, 5,765 flights with 12,328 passengers and 176,192 kg. of baggage.

Aspern, Vienna's airdrome, has not seen a single incident, it is reported, since the international air service was inaugurated.

Mexico Starting Work On International Field

AGUA PRIETA, MEXICO.—Fausto Topeta, governor of the State of Sonora, has issued an order calling for the immediate construction of the Mexican portion of the contemplated international airport on the boundary between Douglas, Ariz., and this city. About 1,300 acres of perfectly flat land, with some 700 on the American side and 600 on the Mexican, will insure the best of runways in all directions, it is asserted.

At this time, the Douglas side of the field has been prepared to receive Standard Airlines planes making this field a stop on the new Tucson-El Paso extension of the Los Angeles-Tucson line. A power line has been run in from Douglas and lighting equipment has been installed.

Plan New Czech Lines

PRAGUE, CZECHOSLOVAKIA.—This country will have three new air lines in 1929, according to a proposal by the Ministry of Public Works. The lines contemplated are: Prague-Kralove Hradec-Moravaka Ostrava; Prague-Liberec (Reichenberg); Brno-Luhacovice-Pistany-Britislava. They will be operated by Czechoslovakia State Airlines.

Australian Firm Shows Gain

LONGREACH, AUSTRALIA.—For the year ending June 30, 1928, Queensland & Northern Territory Aerial Services, Ltd., planes flew a total of 210,364 miles and carried 3,825 passengers. Totals for the previous year were 122,100 miles and 1,840 passengers.

MANUFACTURERS' SPECIFICATIONS ON ENGINES AVAILABLE FOR COMMERCIAL USE AS COMPILED BY *AVIATION*

THE TABLE BELOW IS BELIEVED TO BE ACCURATE BUT *AVIATION* DOES NOT ASSUME RESPONSIBILITY FOR THE FIGURES GIVEN

This table will appear monthly and corrections and suggestions are invited

MANUFACTURER OR AGENT	Engine	Cooling System	Cylinder Arrangement	No. of Cylinders	No. of Cycles	Propeller Drive	Rated Hp. and R.P.M. at Sea Level	Maximum Hp. and R.P.M. at Sea Level	Weight Dry Without Hub or Starter	Weight Per Rated Hp.	Bore and Stroke (in.)	Compression Ratio	B.M.E.P.	Displacement (Cu. In.)	Frontal Area (Sq. Ft.)	Diameter of Mounting Ring or Distance Between Bearers (In.)	Height or Overall Diameter (In.)	Length Without Starter (In.)	Guaranteed Fuel Consumption at Rated Hp. Lb./Hp./Hr.	Oil Consumption Lb./Hp./Hr.	Valve Mechanism	Cylinder Construction (See Key)	No. Intake Valves Per Cylinder	No. Exhaust Valves Per Cylinder	Make Spark Plugs Supplied With Engine	Type of Ignition	Make Ignition	No. Carburetors	Make Carburetors	Make Starter	Are Exhaust Manifolds Provided	Shipping Weight Crated	Dept. of Commerce License	Cost at Factory
Aircraft Engine Co.	Comet	A	Rad.	7	4	D	150-1800				4½x5½					17	46¾	78½	.55	.03	prr	Al, S	1	1		2M	Sc		Sy,E	Be			N	
Allison Engineering Co.	V1410	A	IV-45°	12	4	D	410-1800	430-1900	1000	2.44	4½x7	5.3	128	1410		17		85½	.55	.03	ohe	Al, S	1	1	BG	2B	De	1	Sg²	Ec			Y	
Allison Engineering Co.	VG1410	A	IV-45°	12	4	G¹	410-1800	430-1900	1125	2.62	4½x7	5.3	128	1410		17		85½	.55	.03	ohe	Al, S	1	1	BG	2B	De	1	Sg²	Ec			Y	
Allison Engineering Co.	V1650	W	IV-45°	12	4	D	420-1700	450-1800	885	2.10	5 x7	5.4	122	1650		17	46¼	74¼	.53	.025	ohe	Al, S	1	1	BG	2B	De	1	Sg²	Ec			Y	
Axelson Machine Co.	Axelson	A	Rad.	7	4	D	150-1800		430	2.87	4½x5½			612			45½	35								M	Se	1	Sg				N	
Brownback Motor Laboratories, Inc.*	Ansani 3-35	A	Rad.	3	4	D	35-1700	45-1800	115	3.29	3¹⁵⁄₁₆x4¹³⁄₁₆	5.1		119		9.5	24¹³⁄₁₆	21 ¹³⁄₁₆	.53	.025	prr	S	1	1		2M	AS		Z		N			$735
Brownback Motor Laboratories, Inc.*	Ansani 6-80	A	Rad.	6	4	D	80-1500	89-1600	215	2.69	4½x4⅝	5.1		397		10.6	35¹³⁄₁₆	29	.53	.027	prr	S	1	1		2M	AS		Z		N			1650
Brownback Motor Laboratories, Inc.*	Ansani 10-120	A	Rad.	10	4	D	120-1500	131-1600	320	2.67	4½x5½	5.5		736		11.0	43⅝	34¹¹⁄₁₆	.60	.031	prr	S	1	1		2M	AS		Z		N			2170
Curtiss Aeroplane & Motor Co.	OX-5	W	V-90°	8	4	D	90-1400		375	4.17	4x5	4.9		502		12⅞			.55	.030	prr	Mo, C	1	1		1M			Z		N		Y	
Curtiss Aeroplane & Motor Co.	OXX6	W	V-90°	8	4	D	110-1900		390	3.55	4½x5	4.9		568		12⅞			.55	.030		Mo, C	1	1		2M			Z		N		Y	
Curtiss Aeroplane & Motor Co.	C-6A	W	L	6	4	D	160-1700	165-1750	420	2.62	4½x6	5.2	133	573		15¾	39	57¹⁵⁄₁₆	.52	.015	ohe	Al, Al, S	2	2	AC	2M	Sp	1	Z	U	N	865	Y	
Curtiss Aeroplane & Motor Co.	D12	W	V-60°	12	4	D	435-2300	460-2500	680	1.47	4½x6	5.3	135	1145		15¾		56¾	.52	.015	ohe	Al, Al, S	2	2	BG	2M	Sc	2	Sg	Ec	N	1080	Y	
Curtiss Aeroplane & Motor Co.	Conqueror	W	V-60°	12	4	D	600-2400	635-2450	760	1.26	5½x6½	5.8	130	1569		15¾		56¾	.52	.015	ohe	Al, Al, S	2	2	BG	1M	Sp	2	Z	Ec	N	1060	Y	
Curtiss Aeroplane & Motor Co., Inc.	Geared Conqueror	W	V-60°	12	4	G³	600-2400	625-2450	850	1.42	5½x6½	5.8	128	1569		15¾		56⅝	.52	.015	ohe	Al, Al, S	2	2	BG	1M	Sp	2	Sg	Ec	N	1150	Y	
Curtiss Airplane & Motor Co.	Chieftain	A	H	12	4	D	660-2200	615-2200	900	1.50	5½x6½	5.4	130	1690		23⅝	45½	51¼	.60	.025	ohe	Al, S	2	2	BG	D M	Sc	1	Sg	E	N	1325	Y	
Curtiss Airplane & Motor Co.	Challenger	A	Rad. S	6	4	D	170-1800	180-1800	420	2.47	5½x4¾	5.2	124	603		19	41¾	35⅞	.55	.020	prr	Al, S	1	1	BG	2M	Sc	1	Sg	E	N	850	Y	
Dayton Airplane Engine Co.	Bear	A	L	4	4	D	110-1550	125-1800	375	3.41	4½x7	5.3	118	444		16	39	47⅝	.505	.0175	ohe	Al, NI	1	1		2M	Sp	1	Z	N	N	550		1600
Fairchild Caminez Eng. Corp.	Caminez 447-C	A	Rad.	4	4	D	120-960	140-1050	350	2.50	5½x4½	5.0	120	447	3.9	21½	36	35	.55	.035	prr	Al, S	1	1	AC	2M	Sc	1	Sg¹	Ec	X	775	Y	
Hallet Mfg. Co.	H-526	A	Rad.	7	4	D	130-1800		425	3.26	4½x5	5.2		526		18½	46	37			prr	C	1	1	BG	2M	Sp	2	Z		N		N	
Irwin Aircraft Co.	Irwin 79	A	Rad.	4	2	D	30-1700	25-2200	60	3.00	2½x2¾	5.0	110	79	2.0	4⅛	22	11	.45	.031	Au	Aa, Aa, S	1	1	RB	1M	BR	1	Wf		N	100	N	625
Kinner Airplane & Motor Corp.	K-5	A	Rad.	5	4	D	75-1725	112-1880	268	2.30	4.25x.5.25	5.0		372		14	42				prr	Al, Al, S	1	1	CH	2M	Sc	1	Sg	H	Y	400	Y	1875
Menasco Motors Co.	B-2 Salmson	A	Rad.	9	4	D	260-1500	279-1760	542	2.08	4.92x6.69	5.2					49⅜	38⅛	.42	.025	prr	Al, S	1	1		2M	O	1	Z						3,250
O. E. Szekely Corp.	SR-8	A	Rad.	3	4	D	40-1800	45.6-1900	148	3.7	4½x4¾	4.8	100	191	2.8	9⅞		22¾	.57	.030	prr	C	1	1		2M	BR	1	Z	N	N	205		
Packard Motor Car Co.	1A-2775	W	X-60°	24	4	D	1200-2600	1200-2700	1500	1.15	5½x5	7	150	2775	6.22	14½	45½	78½	.52	.03	ohe	S	2	2	BG	4B	Se	4	Sg	O	V		Y	28,000
Packard Motor Car Co.	3A-1500	W	V-60°	12	4	D	600-2500	650-2700	760	1.26	5½x5½	5.5	140	1498	4.03	15¾	38½	62½	.52	.015	ohe	S	2	2	BG	2M	Se	2	Sg	Ae	N	1275	Y	12,000
Packard Motor Car Co.	3A-1500	W	V-60°	12	4	G	600-2500	650-2700	880	1.46	5½x5½	5.5	140	1498	4.03	15¾	38½	65	.52	.025	ohe	S	2	2	BG	2B	De	2	Sg	Ae	N	1390	Y	17,375
Packard Motor Car Co.	3A-1500	W	V-60°	12	4	D	600-2500	650-2700	780	1.30	5½x5½	5.5	140	1498	4.03	16¼	38½	62½	.52	.025	ohe	S	2	2	BG	2M	Se	2	Sg	Ae	N	1275	Y	12,000
Packard Motor Car Co.	3A-2500	W	V-60°	12	4	D	800-2000	835-2100	1160	1.45	6½x6½	5.7	135	2490	4.8	18½	36½	69¾	.52	.015	ohe	S	2	2	BG	2M	Sc	2	Sg	Ae	N	2150	Y	15,625
Packard Motor Car Co.	3A-2500	W	V-60°	12	4	G	800-2000	835-2100	1380	1.72	6½x6½	5.7	135	2490	5.1	18½	36½	76½	.52	.015	ohe	S	2	2	BG	2B	De	2	Sg	Ae	N	2340	Y	19,375
Pratt & Whitney Aircraft Co.	Wasp	A	Rad.	9	4	D	400-1900		670	1.67	5x5¾	5.2	124	1344		23⅝		43¾	.55	.035	prr	Al, S	1	1	BG	2M	Se	1	Sg		N	1150	Y	
Pratt & Whitney Aircraft Co.	Hornet	A	Rad.	9	4	D	500-1900		760	1.52	6¼x6½	5.0	123.5	1690		23⅝		44¼	.55	.035	prr	Al, S	1	1	BG	2M	Sc	1	Sg		N	1325	Y	
Pratt & Whitney Aircraft Co.	Geared Hornet	A	Rad.	9	4	G2	500-1900		835		1½ 5/8	5.0	123.5	1691		23⅝		48¾	.55	0.35	prr	Al, S	1	1	BG	2M	Sc	1	Sg		N		Y	
Quick Motors Co.	Quick-Radial	A	Rad.	9	4	D	125-1450		325	2.6	4.13x5.51	5		667		19½	36	36			prr	Al, S	1	1	CH	1M	Se	1	Z					1750
Ryan Aeronautical Corp.*	Ryan-Siemens 5	A	Rad.	5	4	D	70-1750	75-1850	258	3.68	3.94x4.72	5.6	110.5	287		14	40½	34		.50	.022	prr	Al, S	1	1	O	2M	O	1	2Sm	RB	Y	630	Y	1,800
Ryan Aeronautical Corp.*	Ryan-Siemens 7	A	Rad.	7	4	D	96-1750	102-1850	328	3.40	3.94x4.72	5.6	108.0	402		14	40½	32		.50	.022	prr	Al, S	1	1	O	2M	O	2	2Sm	RB	Y	675	Y	2,340
Ryan Aeronautical Corp.*	Ryan-Siemens 9	A	Rad.	9	4	D	125-1750	132-1850	382	3.05	3.94x4.72	5.6	109.5	517		14.6	40½	32		.50	.022	prr	Al, S	1	1	O	2M	O	2	2Sm	RB	Y	720	Y	2,970
Tips & Smith, Inc.†	Super-Rhone	A	Rad.	9	4	D	125-1450	133-1650	15	2 52	4½x5½	5.2		667	4.75	11		39	.31	.036	prr	-, S, C	1	1	Sp	1M	Dx	1	Z		N	400	N	
Velie Motors Corp.	Velie M5	A	Rad.	5	4	D	45-1750		210	4.66	4½x3¾	5.2		2506		12¾	32	27	.55	.025	prr	Al, S	1	1	AC	2M	Sc	1	Z	Ec	Y		Y	
Warner Aircraft Corp.	Scarab	A	Rad.	7	4	D	110-1850	120-1925	270	2.45	4½x4¾	5.2	112	422		17	35½	27½	.50	.01	prr	Al, S	1	1	AC	2M	Sc	1	Sg		N			2,485
Wright Aeronautical Corp.	Whirlwind J5	A	Rad.	9	4	D	200-1800	225-2000	500	2.50	4½x5½	5.2	123	788		19½	45	33¾	.53	.035	prr	Al, S	1	1	AC	2M	Sc	1	Sg		N	1000	Y	4,980
Wright Aeronautical Corp.	Cyclone R1750	A	Rad.	9	4	D	525-1900	560-2000	760	1.52	6x6¾	5.0	130	1753		23⅝	53⅝	40⅝	.55	.035	qrr	Al, S	1	1	BG	2M	Sc	1	Sg		N	1530	Y	

*—Engines of foreign manufacture
†—rebuilt
a—applied for
A—Air cooled
Aa—Aluminum alloy
Ae—Aeromarine
Al—Aluminum
AS—Ansani or Scintilla
Au—Automatic
B—Battery ignition
BR—Robert Bosch
Bs—Scintilla booster magneto
C—Cast iron
Ch—Champion
Cylinder Construction
first—head
second—walls or waterjacket
third—sleeve, if any
D—Direct
De—Delco
Dx—Dixie
DM—Dual Magneto
Ec—Eclipse
E—Ensign
G—Geared
G¹—5:3 epicyclic gear
G²—2:1 reduction gear
G.E.—General Electric
H—Hexagonal
I—Inverted
L—Cylinders in line
Mo—Monel
M—Magneto
NI—Nickle Iron
N—No
O—Own
ohe—Overhead cam
prr—Push rods and rocker arms
Rad—Radial
Rad S—Staggered Radial
Sc—Scintilla
Sg—Stromberg
Sg¹—Stromberg NA-U5 duplex
Sg²—Stromberg NAS-8E
Sm—Sum
Sp—Splitdorf
S—Steel
U—U.S.L. Electric
V—Vee
W—Water cooled
Wf—Winfield
X—Extra
Y—Yes
Z—Zenith

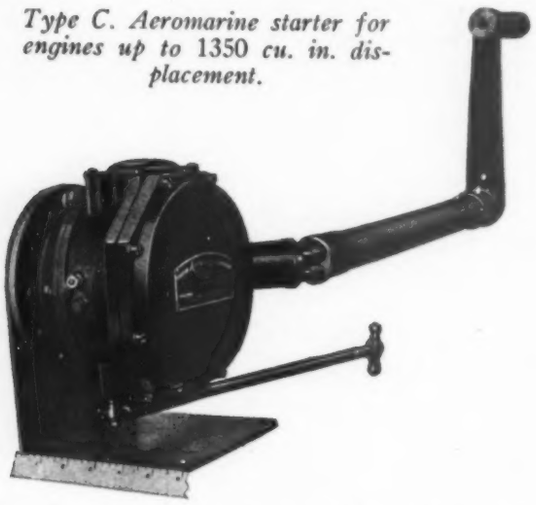
Buyers' Log Book

Aeromarine Inertia Starter

ONE OF the most recent developments of the Aeromarine Starter Co., Inc., Keyport, N. J., is the Type C small concentric inertia starter, designed for aircraft engines up to 1350 cu. in. displacement. This unit has been developed to meet the demand for starting equipment on the smaller engines in commercial and privately owned aircraft.

The type C starter weighs but 17 lb. less crank, is 5 1/16 in. in diameter and has a maximum diameter of 6 7/8 in. The standard starting torque setting is 500 ft. lb. and provision has been made for combined transverse and longitudinal hand cranking. It also can be supplied with electric motor drive.

Installation difficulties are overcome by the large angular capacity universal joint in the handcrank shaft, which



Type C. Aeromarine starter for engines up to 1350 cu. in. displacement.

permits the hand crank to be led off laterally and longitudinally and in all intermediate positions whereby the one machine covers the entire range of installation requirements.

The same standards of workmanship and efficiency which characterize the well-known military types are maintained in this new and moderately priced starter for which an extensive production schedule is underway.

The special hand crankshaft joint arrangement permits of cranking either from the side of the fuselage, or by the more modern disposition with the hand crank in the cockpit, which gives strictly one man starting.

Portable Grinder and Buffer

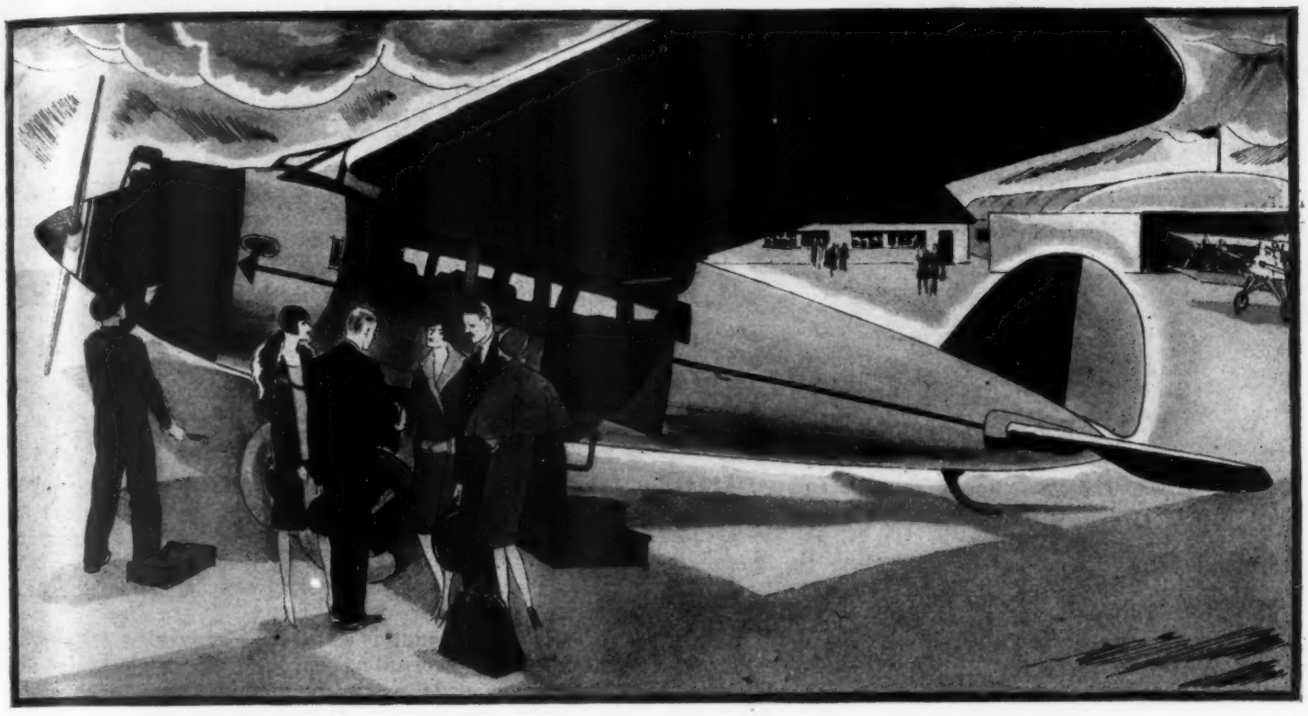
A NEW portable grinder and buffer equipped with a ½ hp. ball bearing motor and Timken roller bearing grinding spindle has been placed on the market by the Hisey-Wolf Machine Co., of Cincinnati, O. For alternating current use, a commutating type repulsion induction motor is provided for single phase service and a squirrel cage motor for two and three phase service. A compound wound motor is furnished for direct current.

The motor is controlled by a two point switch located in the grip handle and a cast steel wheel guard is provided. This guard is adjustable to any desired position. The various sizes include 1, 2 and 3 hp. for alternating current use and 1 and 3 hp. direct current.

Trade Mark Registered

The above trade-mark identifies the genuine mohair fabrics made by

The Shelton Looms
395 Fourth Avenue
New York, N.Y.



STYLE . . . *style in the air* with du Pont finishes

EVEN the most conservative railroads are decking out locomotives and coaches like Joseph's coat—to sell transportation. All industry worships at Beauty's altar. "When the prospect exclaims, 'What a lovely plane' ", says a prominent aircraft manufacturer, "I mark a cross on the dotted line."

Du Pont pioneered the older fields; today special du Pont finishes are giving the aeroplane manufacturer an unlimited opportunity to cash in on this powerful selling force. Duco, Pyralin, Fabrikoid, du Pont Paints, Varnishes and Dopes—every du Pont product is "styled" authoritatively in design, texture, or color.

Feel free to call on the du Pont Color Advisory Service (New York—Paris) to help solve your specific color problems.

Materials created scientifically for their special purpose

Du Pont Aircraft Finishes and fabrics are *scientifically* correct, each for its purpose. Each must meet the severest tests both in the chemical laboratory and in actual flying service. Pigments, for example, must be optically as well as fashionably correct. Here is additional functional utility which you recognize and which ordinary finishing materials cannot approach. When you mention the name "du Pont", your *customers* recognize it.

Du Pont engineers are at your service.

Air-tested Finishes and Fabrics that look and perform better

Du Pont Paints and Varnishes: Du Pont chemists have developed a complete line of paints and varnishes, including Dope-proof Paint, water-resistant Spar Varnish, and engine finishes.

Du Pont "Wing Dope": The du Pont line of nitrate dopes includes many tested formulas remarkable for build and durability. Impermeable, airproof, hard yet flexible, remarkably resistant to violet rays. Available in a wide variety of highly visible colors.

Fabrikoid: Sturdy Fabrikoid is an ideal material for open cockpit upholstery. Will withstand all weather conditions. "Nemoursa Aeroplane Fabrics" are new type, lightweight materials developed for interior trims of cabin ships. Made on a high-grade woven cotton base and treated with appropriate pyroxylin colors. Embossed in distinctive patterns.

Du Pont Pyralin: A strong, durable, light, unbreakable, transparent material furnished in any gauge from 5-1000 upward in sheets approximately 20 inches x 50 inches. Ideal for windshields, cabin windows, running lights and other uses where an unbreakable, transparent material is required.

DU PONT
REG. U. S. PAT. OFF.

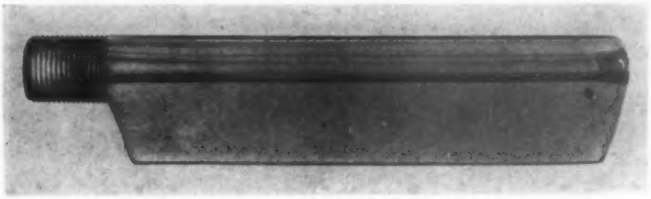
E. I. DU PONT DE NEMOURS & CO., INC.

Du Pont Viscoloid Co., Inc., 330 Fifth Ave., N. Y. C.
Chemical Products Division, Parlin, N. J.
Fabrikoid Division, Newburgh, N. Y.

MEMBER AERONAUTICAL CHAMBER OF COMMERCE

Bakelite Sight Gauge

A NEW type of wing tank gauge made from bakelite has recently been developed by the Apex Specialty Co., of New York City. The transparent bakelite used in making this device, is lighter than glass, and also stronger. Because of the machinability of the material it may be faired with any cross section and threaded at the ends thereby making the installation very simple as no packing glands are required when connecting the gauge to the oil or fuel lines.



The new transparent bakelite sight gauge for wing tanks developed by the Apex Specialty Co.

This sight gauge is not affected by sudden temperature changes which is another advantage found in this type of instrument.

Galion Road Machinery

WITH THE rapidly increasing number of airports throughout the country a necessity has arisen for road machinery to be used in the establishment, development and maintenance of these fields and their approaches. A full line of machinery for this work is being manufactured by the Galion Iron Works & Mfg. Co., which has its factory and main offices at Galion, O. The company also produces culvert pipe equipment and other products used in airport construction.

A complete line of rollers and graders, used for the construction and maintenance of roads in and around airports, is included in the products of the company. The Galion Master Roller is used in road building while the Galion Small Roller is employed to keep fields in condition after they have been established, the smaller roller to keep sod level and firm and to roll gravel and macadam roads. The planer and scarifier manufactured by the company also are useful and the leaning wheel grader is well adapted to this work.

Machinery of this type is now in use at many of the larger airports.

Cutler-Hammer Rheostat

A REGULATING rheostat to control the speed of fractional horsepower direct current electric motors has been added recently to the products of the Cutler-Hammer Manufacturing Co., Milwaukee, Wis. This device is of the circular type, completely enclosed and is small in size providing a compact unit.

The resistance unit is embedded in cement with brass contact points protruding through the embedding material. Resistance is varied by a contact arm which moves over the points and is actuated by an outside operating lever. The unit is protected by a small enclosing case which also prevents accidental contact with the current carrying parts.

The rheostat can be mounted directly on the machine which it is to control or in any convenient position as it requires very little space. It is furnished for conduit wiring but if open wiring is to be used a porcelain bushing can be added without altering the original instrument.

Internationals demonstrate advantages of

HASKELITE
plywood fuselage

THE International Aircraft Corporation has used HASKELITE plywood almost exclusively in the construction of their planes. The good experience of this company is just another evidence of the satisfactory service HASKELITE will render. International uses HASKELITE for building fuselages, ribs, entering edges, box beams, and similar purposes. An approved type certificate has been granted International ships.

HASKELITE'S known ability to stand hard service, its all-weatherproof qualities, great strength, and light weight have assisted many manufacturers in meeting the exacting requirements for an approved type certificate. Safety is always first when HASKELITE blood albumen glued plywood is used. It has proven its efficiency by years of hard service. 85% of the plywood used in aircraft is HASKELITE.

Send for our valuable blueprint booklet of airplane applications.

PLYWOOD HASKELITE PLYMETL

Haskelite Manufacturing Corporation
120 South LaSalle Street Room 1120 Chicago, Illinois

Railway & Power Engineering Corp., Toronto, Montreal, Winnipeg, New Glasgow

AERONAUTICAL CHAMBER OF COMMERCE

California Panel & Veneer Co. 955 S. Alameda Street, Los Angeles, Calif.

THANK YOU *for mentioning* AVIATION

The Keystone Aircraft Corporation

ESTABLISHED 1920

and

The Loening Aeronautical Engineering Corporation

ESTABLISHED 1917

announce the merger of the two companies

Both the Loening plant, 31st Street and East River, New York City, and the Keystone plant at Bristol, Pennsylvania, will continue to operate as at present—thus preserving to the merged company the benefits of the skill and experience acquired by the two established organizations.

In addition to the well-known military types, a complete line of Commercial Cabin Amphibians and Tri-motored Overland Transports will be produced by the corporation.

KEYSTONE

KEYSTONE AIRCRAFT CORP. BRISTOL, PENNSYLVANIA

The SENIOR AIRSEDAN

EIGHT PLACE—DUAL CONTROL

Specifications

Weight Empty	3,000 lbs.
Wing Span	38 ft.
Wing Area	462 sq. ft.
Length	35 ft. 8 in.
Useful Load	3,000 lbs.
Seating Capacity	2 Pilots, 6 Passengers

Performance

High Speed (Sea Level)	135 m.p.h.
Cruising Speed	110 m.p.h.
Landing Speed	45 m.p.h.

Power Plant

Engine	Wasp
Horsepower	425
Fuel Capacity	140 gals.
Oil Capacity	15 gals.

Equipment

Starter; Brakes; Metal Propeller; Compass; Air Speed Indicator; Navigation Lights; Tachometer; Altimeter; Clock; Fire Extinguisher; Fuel, Oil Pressure, and Oil Temperature Gauges; Air Corps Throttles; Strainer and Fuel Valve; Exhaust Manifold; Cabin Heaters.

Price, $18,500

Flyaway our Field, Marysville, Mich.

Buhl Aircraft Company
MARYSVILLE, MICHIGAN

Phylax Fire Extinguisher

EXCLUSIVE DISTRIBUTION rights in North America have been obtained by Command-Aire, Inc., Little Rock, Ark., for the Phylax Aero-Type automatic fire extinguisher which is manufactured by the Phylax Company of Berlin. This apparatus provides a means of reaching fire in these vital parts of the plane which cannot be reached with the ordinary hand type of extinguisher. It is to be standard equipment on all planes manufactured by Command-Aire Inc.

Phylax Aero-Type equipment consists of a tank containing the extinguishing liquid, which is a specially developed chemical. From the tank, which is usually installed in the pilot's cockpit or control cabin, sprinkler lines lead to the parts of the plane where fires usually break out, such as the carburetor and oil sump on the engine. Other lines lead through the area where a fire would be likely to break out. These lines contain fuses which, upon being affected by the fire, release pressure into the tank, forcing the chemical through the various lines to the sprinkler heads, which cover the entire power plant. Pressure also can be released by means of a button in the pilot's cockpit or the tank can quickly be removed and used as a hand fire extinguisher.

The tank carries sufficient chemical to extinguish fire of any size and provision is made to protect parts of the plane other than the engine compartment. The equipment is light in weight and durably constructed.

Hutto Cylinder Grinders

TWO CYLINDER grinding machines are included in the products of the Hutto Engineering Co., 515 Lycaste Ave., Detroit, Mich. These machines are of rugged construction and are also adapted to the grinding of wrist pin holes in pistons and connecting rods as well as bushings of various types.

The single spindle machine, Model GA, is said to have a production rate of 125 pistons per hr. and to grind 600 pistons with a single set of stones. It is driven by a 3 hp. motor through a system of reduction gears and a stroking device imparting rotating and reciprocating motions to the spindle.

The second machine is the Model MGBX, a two spindle unit used for driving the BS and OS type grinders. Housed in the head of the pedestal is a horizontal shaft directly driven from the 1 hp. electric motor and actuating two worm gears. The vertical gear near the motor carries an eccentric. Linked to the eccentric is a walking beam which reciprocates the spindle at a speed of 100 strokes per min. through the hub of the second gear which causes the spindle to rotate at a speed of 200 r.p.m. The stroke is variable from 0 to 3 in.

Portable Oil Dispenser

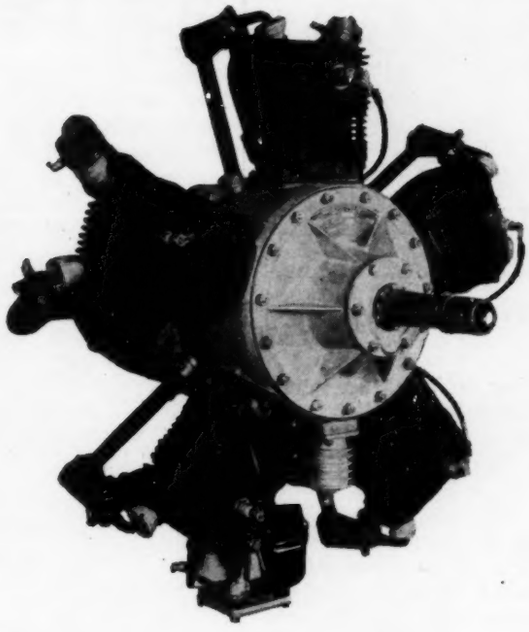
A PORTABLE two compartment oil dispensing unit is included in the line of fueling equipment offered by S. F. Bowser & Co., Inc., Fort Wayne, Ind. This wheel tank has been designed to provide a means of handling two different grades of lubricating oil.

Two pumps, each fitted with a 15 ft. length of flexible kinkless hose, permit direct delivery of oil from either storage tank to the oil reservoir on the plane. The pumps deliver pints, quarts or gallons so that any desired quantity can be easily and quickly obtained.

In order to maintain accurate records of the quaniity of oil dispensed the pumps are fitted with recording meters. A rack is provided on which the hose may be coiled when not in use.

VELIE M5
AIRCRAFT ENGINE

Smashes all Records for ECONOMY *(with Dependability)*



2300-mile Flight in 23½ Hours Made by the Monocoupe with Pilot and one passenger at a total cost of $24.50

This remarkable record for economy was established on September 3rd by Vern Roberts, test pilot, accompanied by Dr. (Scotty) Burmood, service man for Velie radial motors. This Monocoupe powered with the famous Velie M 5 aircraft engine flew from Moline, Illinois, to Los Angeles, California in 23 hours and 30 minutes.

Twenty-five miles per gallon of gasoline, totaling 90 gallons for the entire trip, at 25 cents per gallon, and two gallons of oil at $1.00, making a total cost of $24.50 for the entire trip, or $12.25 per passenger. Never before has the world known of such swift, economical transportation.

The sturdy Velie 5-cylinder radial aircraft engine is designed, engineered under the closest supervision, and manufactured to the highest standards of precision.

We invite inquiries from airplane manufacturers and others who would avail themselves of the opportunity to secure full details of this remarkable engineering achievement —the Velie M 5.

VELIE MOTORS CORPORATION, *Moline, Illinois*

"Ask the Pilot"

Long Life **VELIE**

OWNED AND OPERATED BY ITS FOUNDER
... 1908-1928 ...

THANK YOU *for mentioning* AVIATION

Improved G. E. Motor

AN IMPROVED type of single phase, repulsion induction motor to supplement the present SCR line, has been announced by the General Electric Co., of Schnectady, N. Y. This motor, made in sizes developing ¾, 1½ and 2 hp. at 1,800 r.p.m., is of the constant-speed, high starting torque type. It is adaptable to many uses in the aircraft factory or machine shop.

View of new motor showing commutator end.

One of the most important improvements is the more efficient use of the stator punchings. This is accomplished by taking full advantage of the design possibilities of the polar winding of a repulsion motor. Combined with the change in design a modification has been made in the commutator and brush rigging so that the commutator end shield has the same dimensions as the pulley end shield, thus giving the motor a symmetrical appearance. The motor is equipped with phosphor bronze, waste-packed bearings of the same size at both ends.

The motor is enclosed except for ventilating openings in the lower portion of each end shield. Air is drawn through the ventilating openings at the pulley end by means of an internal fan, passes around the stator laminations and out through the ventilating openings in the commutator end. This construction makes a practically enclosed motor and provides complete protection against falling particles and splashing water.

In spite of this, and the small size of the motor, it is designed to operate within a temperature rise of 40 deg. C. This materially broadens the field of application, permitting the use of a standard 40-degree motor in many cases where only a larger, closed motor would otherwise be chosen.

The "Starwing" Monoplane

(*Continued from page* 1409)

to the forward spar. The points of attachment of the landing gear to the spars are directly below the strut points and the external wing bracing therefore serves a dual purpose. The position of the wheels are placed considerably forward of the center of gravity in order to decrease the possibility of tail-high landings. The tail skid is constructed of welded seamless steel tubing and is non-steerable.

Standard equipment includes dual controls with a removable stick in the passenger's cockpit. All control surfaces are constructed of welded steel tubing. Elevators are actuated by a steel push pull tube and lateral movement of the stick causes the tube to turn about its axis in circular guides. This control is so designed that the tube is in tension rather than compression when the plane is pulled out of a dive. Push pull tubes are also used to operate the ailerons and fibre lined guides are placed at short intervals in the system. Differential action resulting in a downward movement of three inches and an upward movement of five inches at the trailing edge, is obtained without the use of external horns.

Complete Lighting Equipment for Airports and Airways
Airport Floodlights
Beacons
Boundary Lights
Control Equipment
Transformers
Wire and Cable

Candler Field, Atlanta, Ga., is completely lighted to General Electric specifications. The G-E equipment includes a rotating beacon, boundary and obstruction lights, a ceiling projector, and transformers and control equipment. The illustration shows the light produced by a G-E arc mechanism in a BBT floodlight. Power is supplied by a G-E motor-generator set.

711-24

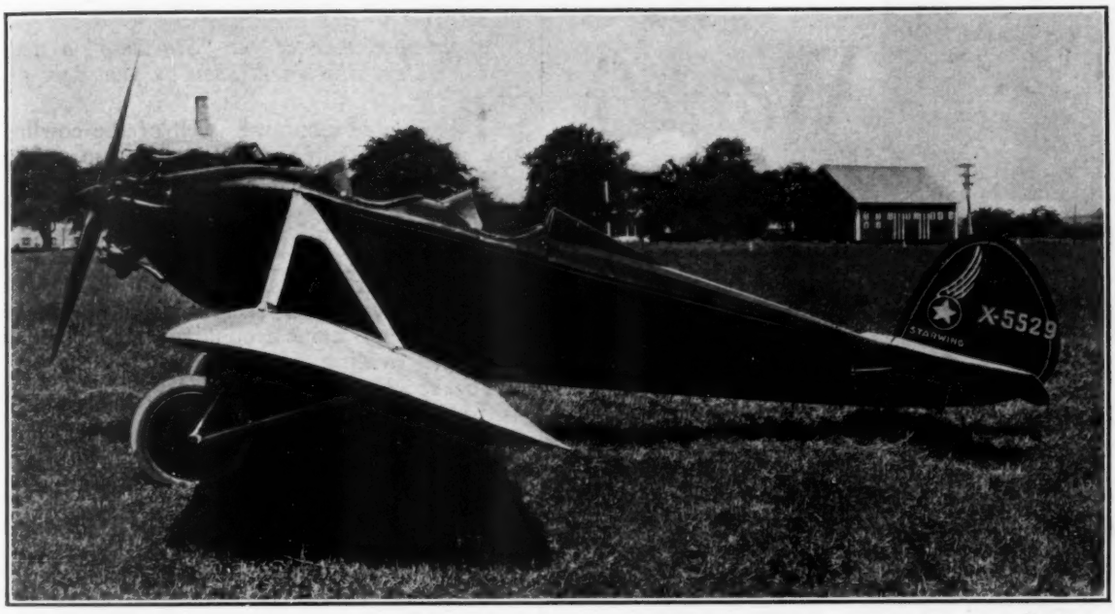
GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

THANK YOU *for mentioning* AVIATION

Introducing the STARWING

a two place monoplane that you will like



Length	23 feet
Height	6 feet, 6¾ inches
Weight	749 pounds
High Speed	105 M. P. H.
Cruising Speed	95 M. P. H.
Landing Speed	35 M. P. H.
Span	29 feet
Cord	67 inches
Fuel Consumption	5 gal. per hour

Powered with a Le Blond 60,
5 cylinder, air-cooled motor

STARWING

Performance figures are based upon tests conducted under favorable conditions.

American Aircraft Corporation, Massillon, Ohio

Genuine Hookless Fastener. Will not jam, rust or break. Launders with perfect safety. Absolutely Guaranteed.

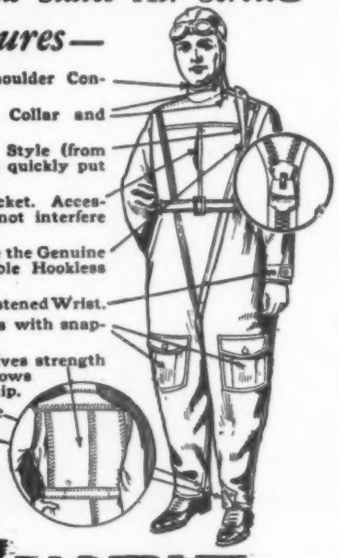
Samuel J. Sampson, National Air Transport Mail Pilot, in his Lee Whizit Flying Suit.

The World's Leading Flying Suit

Veteran *of* Famous Flights and Thousands of Flying Hours

including the United States Air Service

10 *Famous* Features—



- Special Snug-Fit Collar and Shoulder Construction.
- Rust-Proof Snap Fasteners at Collar and Shoulder.
- The Popular Lee Side-Opening Style (from shoulder to crotch) easily and quickly put on or taken off.
- Large Double-Opening Center Pocket. Accessible with either hand. Does not interfere with parachute harness.
- Lee WHIZIT Flying Suits feature the Genuine Rust-Proof, Jam-Proof, Washable Hookless Fastener.
- Close-fitting, Adjustable Snap-Fastened Wrist.
- Large, Bellows Style Map Pockets with snap-fastened flap.
- Box Pleat, Yoke Construction gives strength and smart appearance, and allows free movement in controlling ship.
- Leg Bottoms, fitted with Genuine Hookless Fasteners, open and close for snug fit over footwear.
- Extra full through hips, ample leg room, very comfortable. Neat and Trim.

Lee WHIZIT

UNION MADE

Flying Suits ~ Union-Alls

Mail THIS COUPON *Today!*

H. D. Lee Mercantile Company
Kansas City, Mo., Trenton, N. J.
South Bend, Ind., Salina, Kans.
Minneapolis, Minn.
San Francisco, Calif.

Please mail prices and full details on the Lee Whizit Flying Suit.

Name _____

Address _____

Control forces are applied to the aileron hinge centers at two points by means of a ball-ended floating boom arrangement. The rudder is controlled by cables.

Fuel is fed by gravity through a flexible line from the 20 gallon tank located behind the firewall. A two gallon oil tank is placed just behind the engine which is carried

Rear quarter view of the "Starwing" a new low wing monoplane, which will soon be placed in production.

on a detachable mounting. All of the cowling is removable and all parts of the power plant are readily accessible.

Equipment includes magneto switch, choke and spark controls, tachometer, oil pressure and temperature gauges, gasoline gauge and right and left throttle controls, actuated by free moving tubes. Wiring for lights or radio also can be furnished.

The standard color scheme provides maroon fuselage with an orange stripe around the edge, cream color wings and black cowling.

The specifications furnished by the manufacturer are as follows:

Overall length	23 ft.
Height	6 ft. 6¾ in.
Chord	67 in.
Span	29 ft.
Pay load	180 lb.
Weight empty	749 lb.
Power plant	Le Blond 60 hp.
Load factors:	
High incidence	7.
Low incidence	4.6.
Inverted flight and dive	2.8.
Performance:	
High Speed	105 m.p.h.
Cruising speed	95 m.p.h.
Landing speed	35 m.p.h.

Airplane Engine Ignition

(*Continued from page* 1408)

neto ignition systems. The battery voltage is always ready to give full spark intensity, although at high speed the battery ignition spark tends to decrease in heat value, which is not true with magneto ignition.

The magneto spark, though weak at very low speeds, increases in strength up to a certain point and then tends to maintain a constant heat value, thus giving ideal ignition at all operating speeds. Nor is the need of the booster magneto a serious disadvantage at present, although it might become so at some future date when competition necessitates elimination of all but the absolutely essential equipment units.

Ease of starting, however, has its drawbacks, for there is also the case of having the engine kick back in case the engine is not timed just right or the kick back device is not functioning. Under these conditions the kick back might occur if the propeller is turned inadvertently.

Cessna Facts

The National Air Races proved CESSNA SUPERIORITY—not only over any other cabin ship—but over ALL TYPES.

In Class A, Rowland won. In Class B, Schultz, in his Whirlwind powered Cessna, made the fastest time of any ship, open or closed, carrying a commercial license (or approved type certificate) issued by the U. S. Department of Commerce.

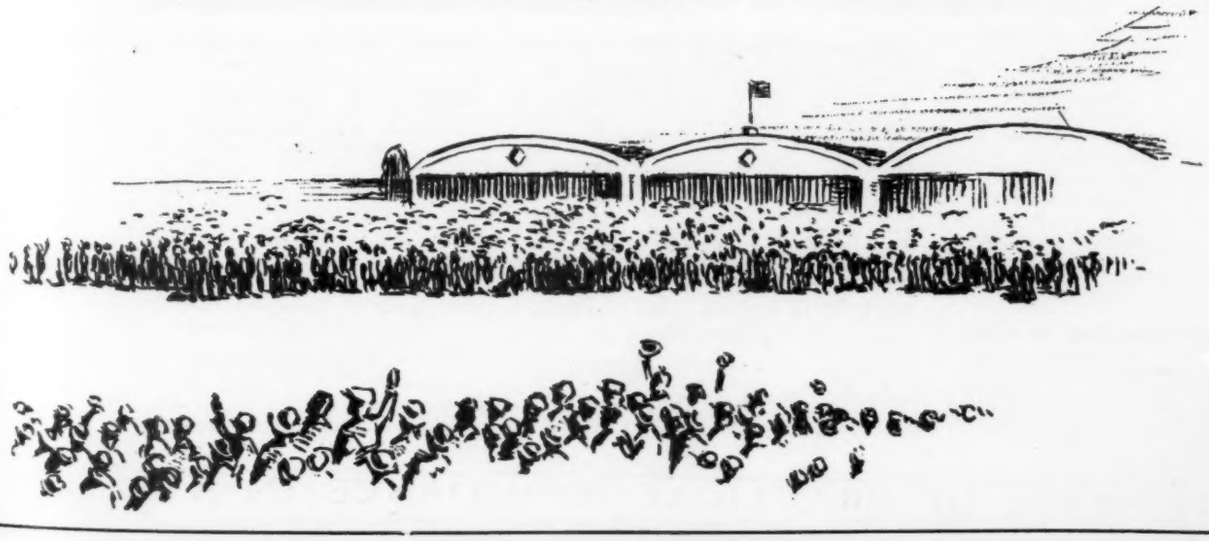
Advanced type of construction and engineering makes possible the tremendous speed of the CESSNA. Even with this great speed, however, the Cessna, with a Warner Scarab motor, has an average landing speed of only 42 m.p.h., with a pay load of 677 pounds, including pilot, and 45 gallons of gas and 5 gallons of oil—an average of 3 tests made at Wichita, at an elevation of 1300 feet above sea level. With the J-5 Whirlwind, the CESSNA, with the same load, showed an average landing speed of only 48 m.p.h. on three tests.

The CESSNA means more speed, greater stability, easier handling, and, above all, more comfort for four people in its luxurious closed cabin.

These are the reasons why CESSNA today is in the greatest demand of any airplane in America—and why CESSNA dealers are "cleaning up."

Wire or write us for the full story. You'll find it very much worth while reading. Act quick—your territory may still be open.

Cessna Aircraft Company, Wichita, Kansas



With the magneto, however, a slight movement of the propeller would not cause a spark, because of the low voltage generated with the magneto turning very slowly.

The question of cost has been mentioned before in connection with future planes sold at low prices. On such planes the matter of weight might also have to be considered more than on larger ones. This would dictate battery ignition, other things being equal and may lead engineers to do research along the lines of battery ignition development of great reliability.

As in the case of automobile ignition, where battery ignition followed the use of the electric starter and generator, there is likely to be a turning to battery units where cost and weight are dominant factors. The tendency to get simplification, to lower the costs of ignition equipment and yet retain the reliability of two separate systems is seen in the development of double magnetos which, with a single shaft, can affect the magnetic condition of two separate coils or windings and thus give two separate systems electrically.

Such construction duplicates the electrical units although giving a common mechanical link in shaft, bearings, gears, etc., the failure of which would put out of commission both of the electrical parts of the ignition system. Mechanical failures are, of course, relatively rare as compared with point, coil, condenser and other electrical failures, so that such systems are better than single units, but not quite as good as entirely separate sources of ignition.

Maintenance costs may have to be considered at some time in the future, particularly on equipment used in commercial service. It is doubtful, however, if this angle of the question would influence the individual user of a plane to any appreciable extent. Platinum iridium points on magnetos cost more than tungsten points used in battery systems. Other parts are similar in cost, however.

Performance of magneto and battery systems has been discussed from the standpoint of ease of starting, reliability, testing and so on, but there is the possibility of spark voltage having some effect on future designs. The voltage required at the plug is affected by the gap, the points and the compression pressure.

As compression has increased in motor cars, the spark plug points have merely been set closer, so that ignition voltages have remained substantially unchanged. The same is true of airplane ignition, where the spark plug gap is set to suit the engine and the ignition device.

Even with superchargers it is doubtful if higher spark voltages will be needed or desired, for their use up to the present in airplanes has been chiefly to duplicate at high altitudes the compression pressures and engine efficiencies available at lower levels. And both magnetos and battery ignition systems have met all requirements of present day engines even when the compression has been relatively high.

Purchasing and Receiving the Materials

(*Continued from page* 1407)

6. Inspection of materials and their delivery, if approved, to storeroom or shop, properly tagged.

7. Posting of receipts on stores ledger, or production order.

8. Checking off receipts against the purchase order.

9. Follow-up of delayed deliveries.

10. Receipt of invoices and entry of same in some form of "invoice register."

11. Checking of invoices against purchase order and

(*Continued on page* 1436)

"How To Use Aviation Insurance Protection Economically and Advantageously"

Insurance Protection Available

aggregates over $1,000,000 per aircraft

Constructive total loss
Accidental Damage
Fire, Tornado, Theft
Cargo (direct and liability)
Damage to ground property
Airport and Airmeet liability
Life insurance
Public liability
Property Damage
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Compensation
and
other forms constructed as required

An Open Market to all Insurance Companies, Reinsurers, Agents and Brokers. Standard conditions amended to meet special requirements.

. . . . Is the title of our new brochure. Ask us for a copy. It explains also our free advisory service founded on 20 consecutive years' practical experience in aviation and supported by our corps of highly qualified aeronautical engineers and our staff of executives, each one of broad practical experience in flying besides long training in insurance.

GOOD SERVICE COUNTS

More aviation claims paid by our organization than by all other organizations throughout the world.

Lowest Rates-Broadest Coverage-Highest Indemnities-Quickest Service

Policies have been issued over a long period of years and, among others, in favor of Federal and State Governments, Boeing Air Transport, Pacific Air Transport, Colonial Air Transport, Colonial Western Airways, National Air Transport, Western Air Express, Robertson Aircraft Corp., Colorado Airways, Northwest Airways, Walter T. Varney, Inc., Southern Dusting Co., Philadelphia Rapid Transit, Stout Air Service, Boston Airport Corp., American Railway Express, Ford Motor Company, Fairchild Aerial Surveys, Fairchild Flying Corp., Pacific Marine Airways, Pitcairn Aviation, United Cigar Stores Co., Royal Typewriter Co., Hamilton Maxwell, Inc., Pulitzer and other race meetings, Universal Motion Picture Corp., Fox Film Corp., American Airports, Inc., Jefferson Airways Corp., Midplane Sales & Transit Co., Stinson Aircraft Corp., Thompson Aeronautical Corp., Atlantic Aircraft Corp., Pratt & Whitney, Caddo Co., Chas. Rogers Productions, Canadian Transcontinental Airways, Ltd., Western Canada Airways, Ltd., S.C.A.D.T.A. of Colombia, S. A., Andian National Corp. of Colombia, S. A., Maddux Air Lines, Scenic Airways, Standard Oil Co. of Cal., Richfield Oil Co. of Cal., Trans-continental Air Transport, The Daniel Guggenheim Fund for the Promotion of Aeronautics, Gene Tunney, and many others including Col. Charles A. Lindbergh, Sir Hubert Wilkins, Anthony Fokker, and other leaders in aviation.

BARBER & BALDWIN, Inc., Graybar Bldg., New York City, *Tel.* Lexington 4316

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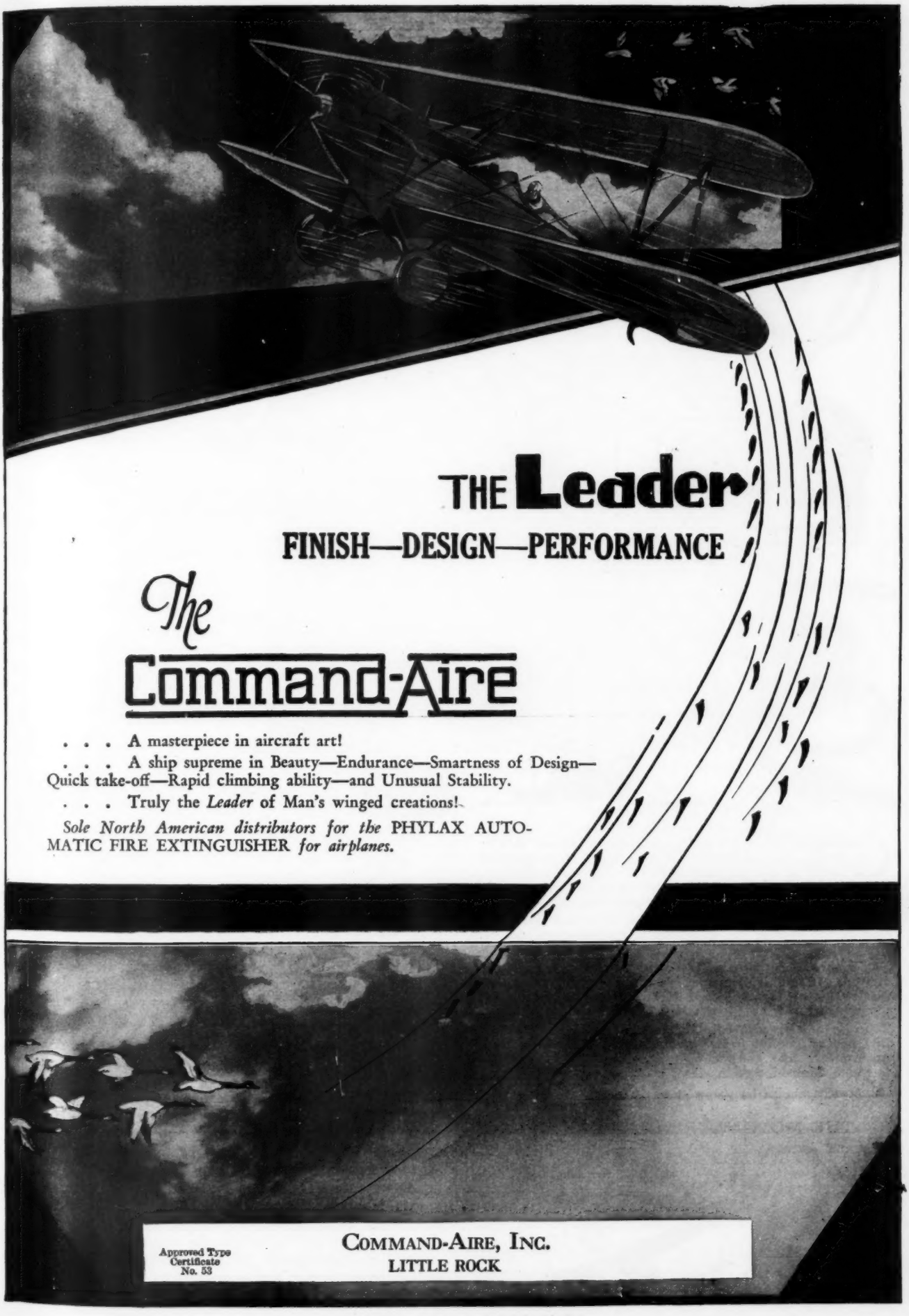
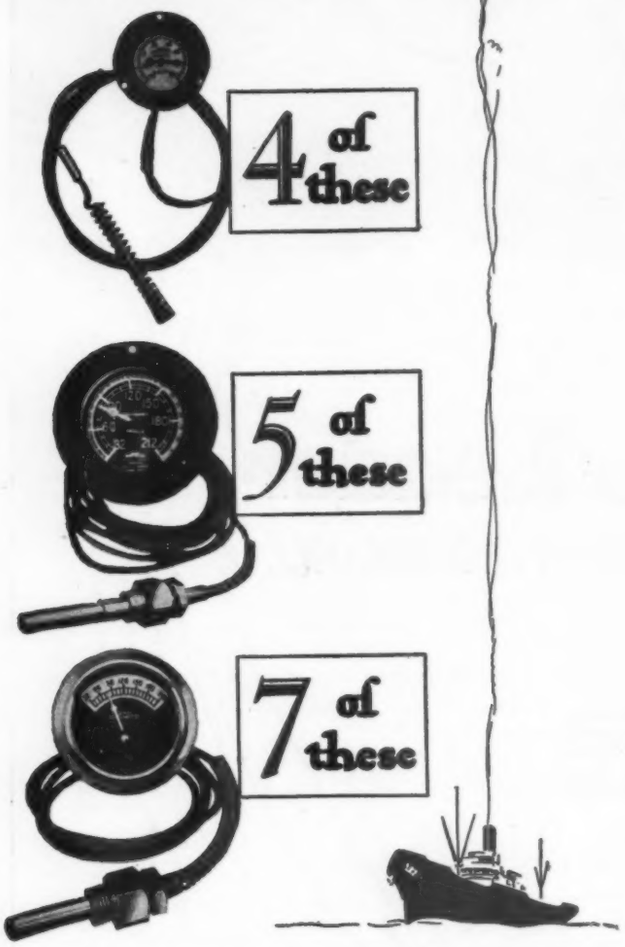

THE Leader
FINISH—DESIGN—PERFORMANCE
The
Command-Aire
. . . A masterpiece in aircraft art!
. . . A ship supreme in Beauty—Endurance—Smartness of Design—Quick take-off—Rapid climbing ability—and Unusual Stability.
. . . Truly the *Leader* of Man's winged creations!
Sole North American distributors for the PHYLAX AUTOMATIC FIRE EXTINGUISHER *for airplanes.*
Approved Type Certificate No. 53
COMMAND-AIRE, INC.
LITTLE ROCK

THANK YOU *for mentioning* AVIATION

16 MOTOMETERS ..go with Byrd



COMMANDER BYRD knows his scientific instruments. Consequently we were more than gratified when he selected four Model C Boyce MotoMeters with special air temperature bulbs as equipment for the four airplanes he is taking to the Antarctic.

These instruments (see Illustration 1) are designed to read in the cockpit the atmospheric temperatures out on the edge of the wing.

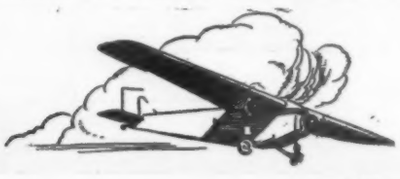
The air-cooled engines of his Ford tri-motor, his Fokker and his Fairchild 'planes are equipped with a standard Model C MotoMeter each, for reading the lubricating oil temperatures. (See Illustration 2.)

Then he took seven Model H MotoMeters (Illustration 3) for reading cooling water temperatures of engines used on tractors and electric light generating sets, making fourteen MotoMeters in all.

Let Byrd's choice be yours also.

THE MOTOMETER COMPANY, Inc.
2 Wilbur Avenue Long Island City, N. Y.

The MotoMeter Co. of Canada, Ltd., Hamilton, Ont.



(*Continued from page* 1434)

12. Closing out of completed purchase orders.

The forms made use of in the above routine are:

(a) Request for purchase.
(b) Purchase record card.
(c) Request for quotation.
(d) Purchase order.
(e) Receiving report.
(f) Inspection tag.
(g) Invoice register.

The first four apply to purchasing, and the fifth and sixth to receiving. These are illustrated, or are described. The last, as an accounting form, will be considered in a later article.

The purchasing department will want to file together all papers relating to one purchase order. So far as possible, these should be of the same size, and should be

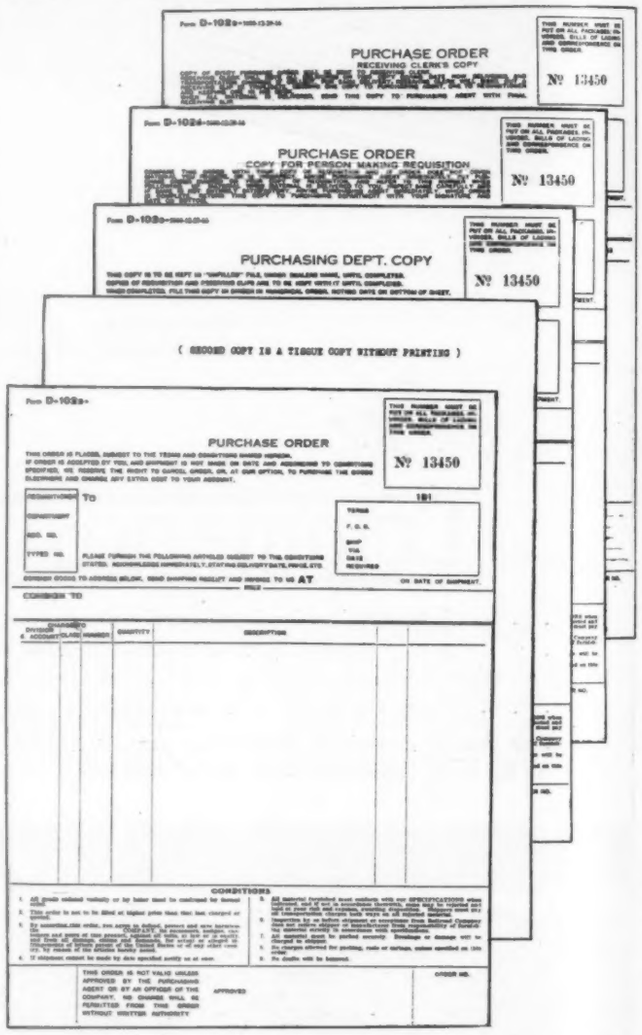
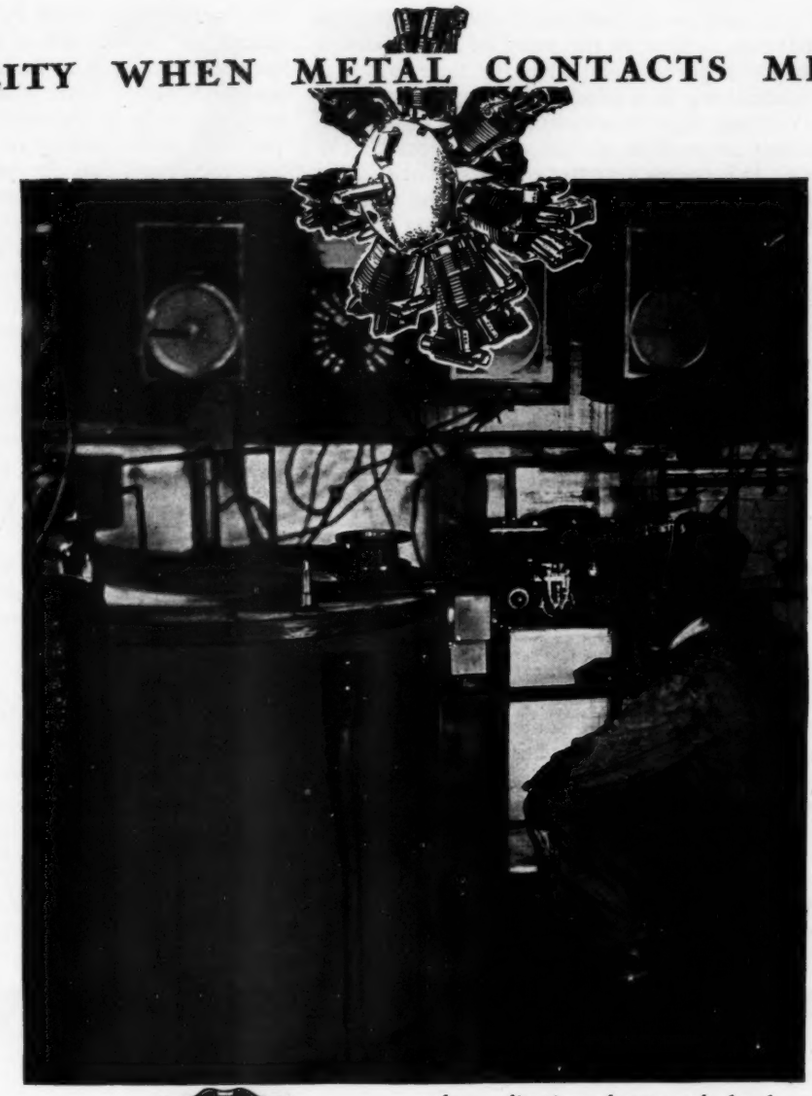


Fig. 3. A sample purchase order form, showing the various copies. Note the customer's standard conditions which appear near the bottom.

adapted for vertical filing. Letter-size is the best. The small slips sometimes used for purchase requests are a nuisance. The letter-size sheet encourages giving full data of what is wanted and provides space for purchasing department entries.

Fig. 1 shows a requisition form to the purchasing department. It is particularly important that this request show the purpose for which the material is required by giving the order number, if for a production, maintenance, or betterment order; stores number, if for standard stock; department and expense numbers, if for some expense

DEPENDABILITY WHEN METAL CONTACTS METAL



THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

"THERE is no economical substitute for quality." This since the inception of the Axelson Machine Company, nearly forty years ago, has been the standard for production. In the manufacture of the Axelson Airplane Motor this same high standard for quality, in *workmanship* as well as *materials*, stands as the foundation upon which Axelson builds both *dependability* and *durability*.

In the production of parts, where metal is forced to contact metal in the generation of power, the degree of dependability is measured by *durability*. To attain these essential elements Axelson not only employs the use of selected, metallurgically proven metals of more than required strength, but Axelson metallurgists introduce a special method of heat-treatment in the application of extremely hard surfaces to such parts.

Minute precision is prerequisite in the manufacture of cam rings, gears, etc. The process of heat treatment here employed eliminates the distortion occuring under ordinary methods of treatment, while preserving precision and applying a surface, the hardness of which can be tested only by a diamond scratch. Thus through intensely hard surfaces, plus toughened supporting structures, wear is reduced and the life of the part is increased. In adding resistance to wear the hazard of breakage in flight is minimized and thus increased dependability is achieved.

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(The Second of a Series of Advertisements Pertaining to Axelson Scientific Production)

account; and the machine or building number, if for repairs. This purpose is clear in the mind of the requester when he writes the request, and that is the time to put it down. It is astonishing how often this simple expedient is neglected. Without this information, weeks or months later, it is almost impossible to allocate invoices to the correct charges. It becomes a matter of guess work. This can all be avoided by putting the charge on the original request in the first place, as illustrated in the sample shown.

This form is made in two copies, bound in a book, the original to be torn out and sent to the purchasing department, the carbon copy to remain in book as record for the requester. These requests should be serially numbered in duplicate for identification.

The purchase record is ordinarily a card or loose-leaf record, letter size, filed either in a vertical file, or a binder, according to kind and description of material. On it are entered records of quotations received from various suppliers and of orders placed against them. Properly kept, it is a very valuable reference record for comparing prices, terms, deliveries, etc., of different periods and from different sources. A simple ruled sheet is all the form that is required.

Printed Form Sometimes Used

The request for quotation is sometimes made on a specially printed form, as illustrated in Fig. 2, but it is more common, and ordinarily quite sufficient, to make it in letter form using the regular letter-head.

The purchase order is the most important form in this group. It authorizes the one addressed to deliver materials or services; it creates a liability; when accepted, it becomes an enforceable contract. A formal acceptance is not necessary. It is sufficient that the supplier, within a reasonable time, shall have begun taking action toward filling the order. When he has done so, the contract becomes as binding as though it had been formally signed and accepted. After that time changes and corrections may be made by the customer only by grace of the supplier and with liability for their added cost. It is important, therefore, that the purchase order be complete in all details, giving full instructions, with all conditions and reservations plainly noted. It is common practice to have the customer's standard conditions printed on the form, as in the sample shown in Fig. 3.

Serial Numbers for Purchase Orders

Purchase orders should be serially numbered. They should have copied on them, when typing, the serial number of the request for purchase from which they are written and the initials of the requester. All data and information finally given on the request should be copied on the order, including charge-numbers, stores numbers, etc.

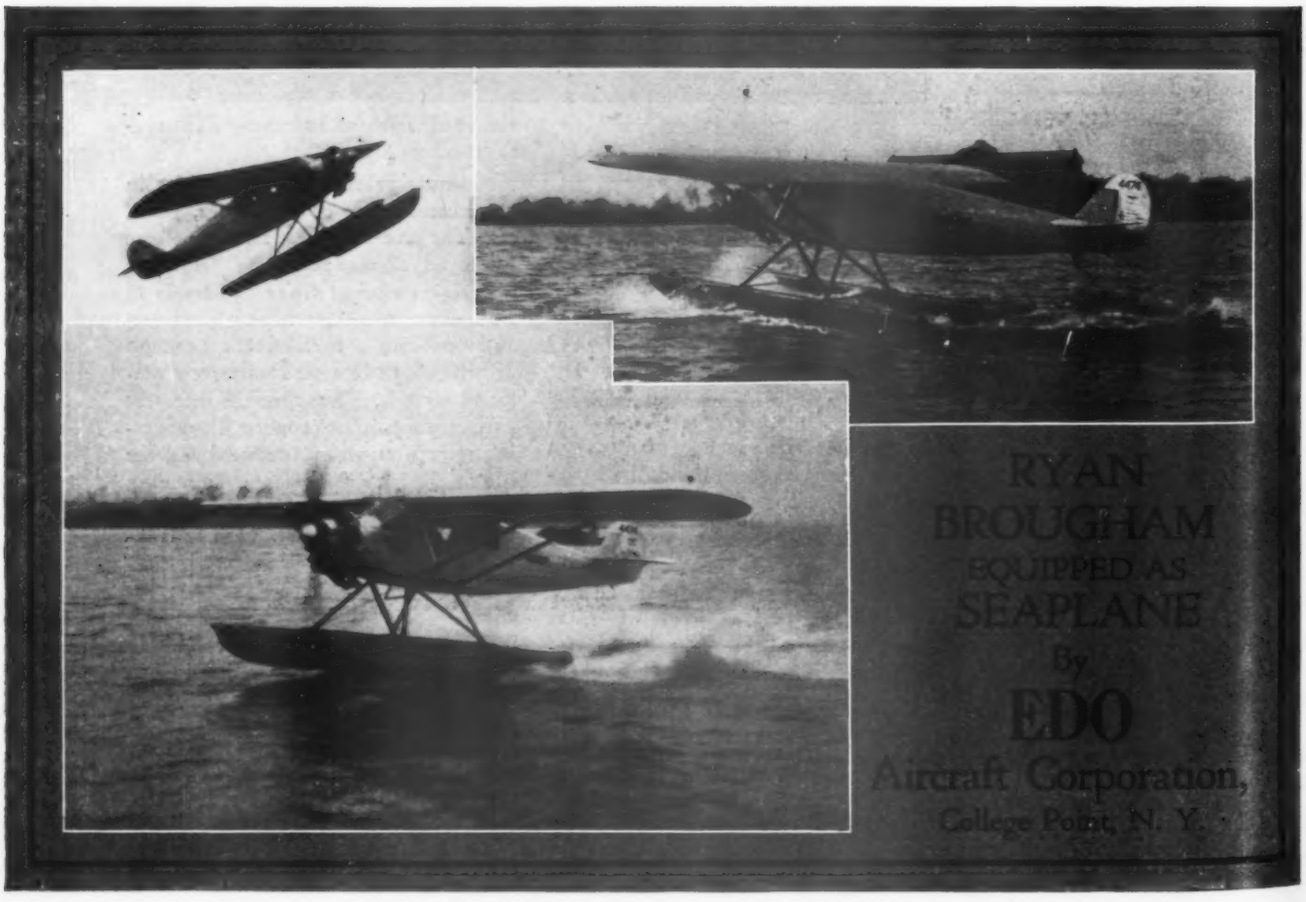
The purchase order will be typed with a number of copies, each serving a different use. These will vary somewhat in different concerns, but will usually be as follows:

(a) Original, sent to supplier.
(b) Copy for purchasing department's unfilled file, according to names of suppliers.
(c) Copy for file according to order number (tissue copy, no printing).
(d) Copy for requester.
(e) Copy for receiving clerk.

Sometimes other copies are required, as:

(f) Copy for engineering department.
(g) Copy for production department.
(h) Copy for auditor, etc.

By choosing suitable qualities of paper and carbon it



25

Years of Aeronautical Progress

and AVIATION'S *part during the past 12 years*

WHETHER you exhibit at the Chicago show or not, you will want to be represented in the International Exposition issue of AVIATION to appear December 1, 1928. In announcing this issue to the aircraft industry AVIATION wishes to emphasize the fact that for twelve years it has taken an active part in the development of the industry that next month celebrates its Quarter-Century anniversary.

A pioneer in its field, AVIATION is America's oldest aircraft magazine. AVIATION established itself early in the history of aeronautics and gained the confidence of those in the business by maintaining a sound, aggressive and constructive editorial service. AVIATION has adhered to this policy and has maintained its leadership, being recognized today as the American authority on aeronautics.

The editorial record of AVIATION in the opinion of leaders in the field, has no equal. It has accurately and intelligently promoted and reported American aeronautics since the publication was founded in 1916. With a larger and more experienced editorial staff than any other American aircraft publication, you have assurance of a complete editorial service in connection with the International Aeronautical Exposition as a background for advertising.

To benefit most from the widespread interest which unquestionably will be created by the Chicago show, regardless of whether or not you are one of the exhibitors, your name and products should be placed before the aviation buying public in the publication that is preferred by those actually engaged in the aircraft business with the added assurance that these informed readers of AVIATION are constantly bringing your products before a widening circle of prospective buyers.

There will be no advance in advertising cost. Closing date for copy requiring proof—November 15. Forms close November 22.

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This year the manufacturers who incorporated these struts into their ships have found this to be a fact.

Next year, when supply will inevitably catch up with demand, the marked preference on the part of owners and pilots for Aerol Strut-equipped ships will be a still more active factor in helping alert manufacturers to hold their own in a competitive market.

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"Ask the Pilots Who Land on Them"

AEROL shock absorbing STRUT

is not difficult to type the five or more copies called for, while it is possible to reduce the set to three by omitting copies (d) and (e). Experience advises against this. These two copies are well worthwhile.

While it is possible to make numerous variations in the form of the purchase order without impairing its usefulness, the form here illustrated has been used under widely varying conditions and found well adapted to its purpose.

It is necessary for the receiving clerk to report daily the quantities, descriptions, sources, and purchase order numbers of all goods received. One method of doing this

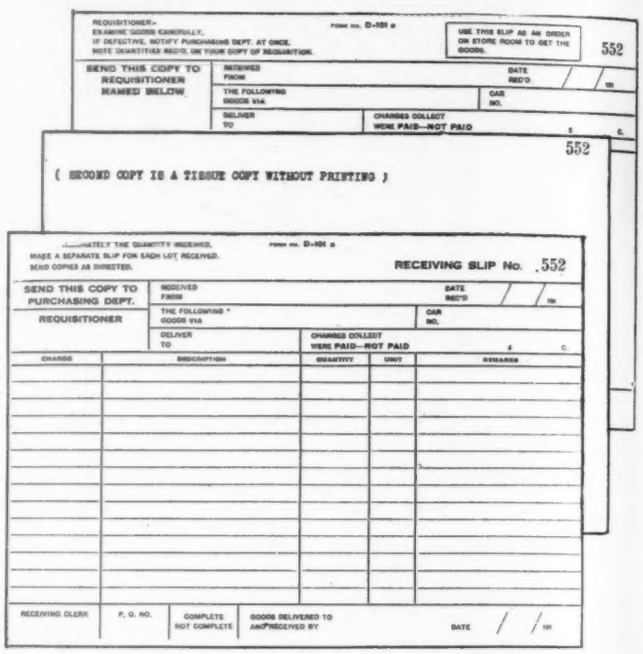


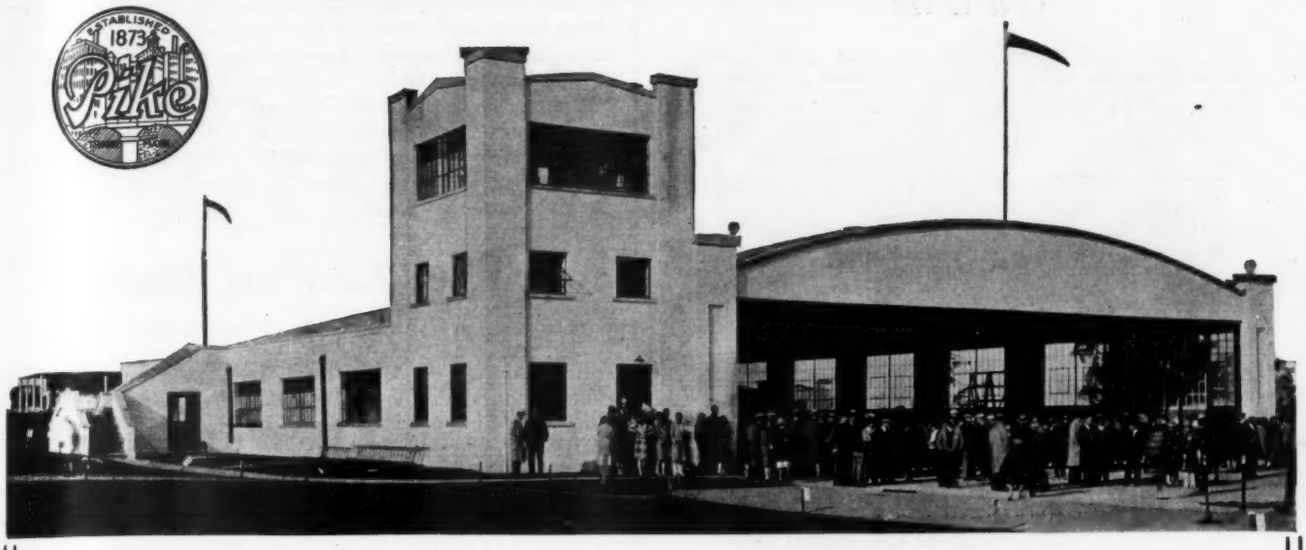
Fig. 4. A separate receiving slip for all goods received each day on individual purchase orders.

has been to list all receipts on order on a large sheet of paper, and to send one copy of this to the purchasing department, which noted the contents on its purchase orders. This plan leaves much to be desired. A better plan is to have a separate receiving slip for all goods received each day on each purchase order. Sample of such a receiving slip is shown in Fig. 4. It is made in three copies, one for the purchasing department, one for the requester, to notify him that his goods are in, and one as the receiving clerk's copy. The best way to make these is by using some form of autographic register. This keeps and delivers all copies in good shape, and removes the bother of loose carbons.

The other form required by the receiving clerk is the inspection tag. This is an ordinarily manila tag with spaces for inserting the date of receipt, purchase order number, department or person requiring the goods, and signatures of the receiving clerk, the inspector, and one to whom the goods are delivered. This tag is made out at the same time as the receiving slip, is attached to the material, and remains on it until it is finally used on the job, or is put in stock. If the material is of such a nature as to require inspection before acceptance, the inspector places his initials on the tag or punches it with his private punch, as an indication that he finds the material acceptable.

Sometimes these tags are made with detachable coupons, or with self-carbonized slips pasted on, that may be torn off and turned in by the inspector, as notice that he has passed the goods, or by the one to whom they are delivered, as evidence that he has received them in good condition. In such case, these coupons, or slips, are sent on

ESTABLISHED 1873 Pike



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Left Wichita Mo. 5 Day 20 Hour 9 05 AM
Arrived BFD. PA. Mo. 5 Day 21
Hour 3 25 PM Distance 1100 miles.
Flying time—Hours 15 Minutes
Average speed - - - 73.3
Amount of gas used - 103 GAL.
Amount of oil used - - 1½ GAL.
Interesting and unusual happenings enroute:
HEAD WINDS TWO THIRDS OF WAY, MOTOR TURNED 1400 ALL THE WAY
Signed W. H. EMERY JR.
Address BRADFORD, PA.
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3 INCH BELT

Moleskin cloth, waterproofed; lined with sheepskin, fleece ½ to ¾ inch thick. Talon hookless fasteners in front and wrists; wind shield gussets an ankles. Collar of extra fine fur.

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When you plank down your money for a blow-torch

You BE surprised what a lot of things there are inside of a blow-torch. When you buy one you have to take those insides pretty much for granted—the outside won't tell you a thing. Yet the insides of blow-torches differ considerably, making one work better and last longer than another.

If you'll take a look, next time you're buying one, make sure the name Clayton & Lambert is on it, you can be mighty certain you're getting the torch that will do the job you want it to so, will keep on doing it in fine style, and that the price represents the best value you can buy.

And here's why. We've been making blow-torches for forty odd years. Our first one was a good one. But that just made us want to make a better one—and that's the way we've felt about it all these years. As a result we've developed a list of improvements as long as your arm, and we hold patents on them.

Those are real improvements. So real that the better performance of Clayton & Lambert blow-torches has made us the largest manufacturer of blow-torches in the world, with volume production that permits giving better quality at any given price and in every wanted type and size.

So when you plank down your money for a blow-torch—make sure the name Clayton & Lambert is on it.

CLAYTON & LAMBERT MFG. CO.
Detroit, Michigan

to the purchasing department and are filed with the purchase order and copies of receiving slips for future reference in case there is any question as to the receipt, or quality of the material.

The subject of Purchasing and Receiving is a very large one. It has been possible here for Mr. Douglas to touch only on the more salient points. In his next article, which will appear in an early issue, he enters the field of costs.

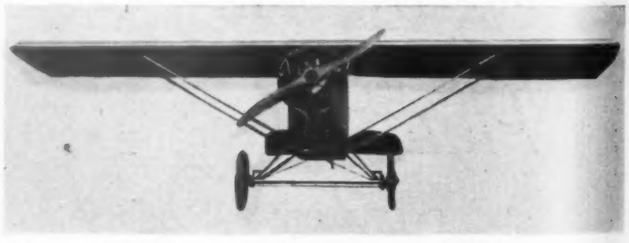
The "Golden Eagle"

(*Continued from page* 1405)

Wheels are 26 by 4 in. fitted with Goodyear tires. Tail skid is non-steerable spring leaf type bolted to fuselage. The angle of the wings when the plane is in a three point position on the ground is 15 deg. from the horizontal.

The Velie engine is fastened to a mounting ring by eight 5/16 in. bolts. The detachable engine mount is attached to the fuselage by four ¼ in. nickel steel bolts. Present fuel supply consists of a 7 gal. gravity tank carried in a cradle between the top and bottom drag wire bracing of the wing center section, and an 11 gal. gravity feed tank carried in the upper part of the fuselage forward of the passenger cockpit. Gasoline lines are of annealed copper tubing with flexible rubber elbows. The oil lines are of flexible metal tubing. An aluminum firewall separates the engine compartment from the forward cockpit. The propeller used is manufactured by the California Propeller Co. Straight individual exhaust stacks are fitted, with a collector ring as optional equipment.

The weight of fuel and passenger is carried approximately on the center of gravity which is 21¾ in. behind the entering edge of the wing. Cockpits are 33 in. long, 34 in. deep and 25 in. wide, seats are wicker and French



Front view of the original experimental model of the "Golden Eagle" monoplane. This plane is powered with an Anzani engine.

type safety belts are fitted. Entrance to cockpits is facilitated by steps and by a door on the left side of the passenger cockpit. Altimeter, tachometer, oil temperature, oil pressure gauge, carburetor choke and engine switch are mounted on the Consolidated instrument board; with navigation lights if desired.

Dual controls with removable stick in forward cockpit are provided for. Stick and stirrup controls are used, with wires to ailerons and rudder; and push and pull tube to elevators. All control surfaces are carried on steel bearings with oil holes for lubrication, and with control mechanism visible for inspection. Visibility from pilot's cockpit is very good. All fittings in the plane are of air service 1025 steel. Twelve gauge reinforced steel is used on all main fittings.

A factory of 10,000 sq. ft. floor space is now being used. A large dope room has been erected in the rear. Modern machinery has been installed, including nibbling machine; hand press, cutter and bender for shaping fittings; electric drills and emery wheels, wood working machinery, etc. Small parts for the plane are assembled on

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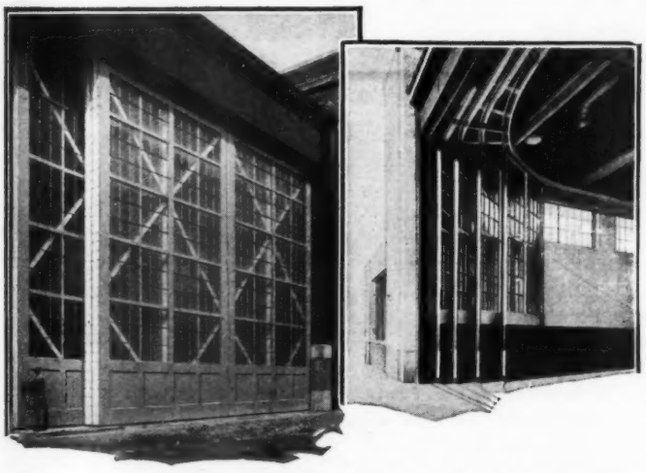

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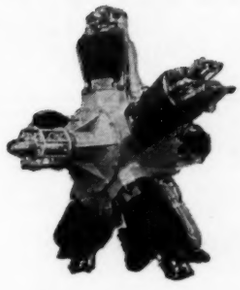

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jigs of excellent design. Welding is done in permanent jigs by men who have had several years of experience at this type of work. All inspecting is done by Mark M. Campbell, designer of the airplane and now production engineer of the factory. The inspection system is simple and effective. If anyone in the factory makes a mistake he is dismissed. All metal work follows a production line down the left side of the building, wood work down the right side, doping in the rear, and assembly assembly in the center.

Mark M. Campbell, designer of the Golden Eagle monoplane, has enjoyed a 13 year career as a stunt man, pilot and engineer. He started to develop the Golden Eagle in June, 1924. After perfecting the design he succeeded in obtaining the backing of R. O. Bone, the present manufacturer, on July 15, 1928. A building was rented on July 18 and the first plane was flown 35 days later. On its first test the plane was taken up three times in the same day without any adjustment being made. A second plane was completed 13 days after the first one. Both of these models were shown at the Los Angeles Aeronautical Exposition with such success that quantity production was at once determined upon.

The specifications supplied by the manufacturer are as follows:

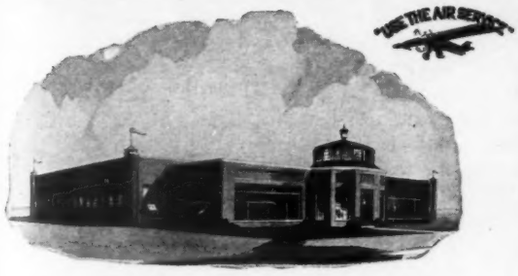
Length, overall	21 ft.
Height, overall	6 ft. 8 in.
Airfoil	Modified Clark Y
Span	28 ft.
Chord	4 ft. 6 in.
Wing area, total	126 sq. ft.
Ailerons, total	14 sq. ft.
Stabilizer, total	10 sq. ft.
Elevators	10 sq. ft.
Fin	1½ sq. ft.
Rudder	5 sq. ft.
Weight empty	590 lb. (approx.)
Pay load	200 lb.
Disposable load	500 lb.
Gross weight, loaded	1050 lb.
Powerplant	Velie 45 hp.
Powerplant, weight	210 lb.
Wing loading	9 lb. per sq. ft.
Power loading	14 lb. per hp. (normal)
High speed	110 m.p.h.
High speed at 5000 ft.	100 m.p.h. (est.)
Cruising speed at 1550 r.p.m.	85 m.p.h.
Landing speed	30 m.p.h.
Takeoff run	100 ft. (still air)
Landing run	300 ft. (still air)
Climb at sea level	850 ft. per min.
Ceiling	12,000 ft.
Gasoline consumption	4 gal.per hr.
Gasoline capacity	20 gal.
Range	450 mi.
Endurance	5 hr.

Wanted:—Suitable 1929 Air Tour Formula

(*Continued from page* 1403)

appointed, headed by a man, who, at that time, was with the Wright Aeronautical Corporation. That man worked with us for a time, but since then he has left the Wright organization, and the so-called advisory committee apparently has ceased to function.

"With several modifications the present Tour formula, contest load times speed, divided by stick plus unstick times 50 divided by the motor displacement, is the same as the formula used since the Tour of 1926.



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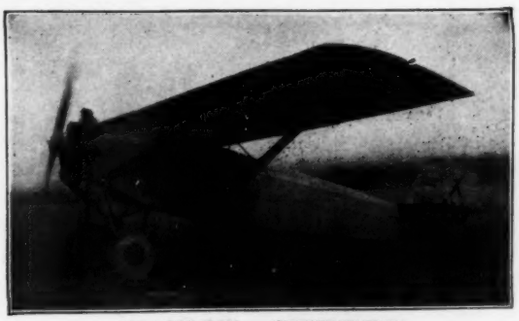

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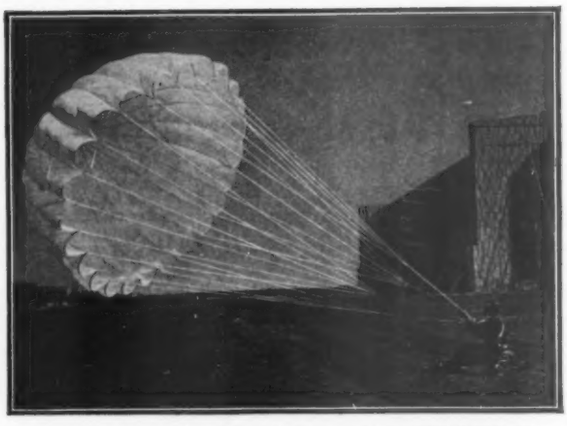

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This formula was drafted by a committee of aeronautical engineers including Mr. Mayo, Alfred V. Verville, now secretary of the newly organized Verville Aircraft Co.; Capt. L. M. Woolson, of the Packard Motor Car Co.; William C. Naylor, chief engineer of the Stinson Aircraft Corp.; and William B. Stout, manager of the Airplane Division, Ford Motor Co. The draft was submitted to the Contest Committee of the National Aeronautic Association, the United States Department of Commerce and the National Advisory Board of the Bureau of Aeronautics, U. S. Navy. No one connected with any of those organizations suggested any change in the formula.

"The Contest Load, in 1926, meant any load the pilot saw fit to carry, providing the plane had one cubic foot of cabin or cockpit space for every 25 pounds of load. The following year, in order to prevent racing, we used the same formula but inserted a clause requiring the pilots to maintain only 85 per cent. of their maximum speed as shown in the pre-Tour tests. This year, as you know, we again used the original formula, but for the first time the Department of Commerce decided to strictly enforce their load carrying regulations. No ship was allowed to take off on the Tour carrying weight in excess of that allowed them by their Approved Type certificate. Further changes this year were that we allowed contestants to carry only 75 per cent. of their actual contest load, and to reduce their speed to 80 per cent. of the maximum set in the pre-Tour tests. Between San Antonio Texas, and Great Falls, Montana, they were allowed to reduce their speed to 75 per cent. of the maximum."

Pre-Tour Tests Chief Objection

So much for the history of the formula. Now, then, what is wrong with it? The major complaint, of course, as the pilots have pointed out, is that the pre-Tour tests virtually decide the winners. Probably the second largest fault is that the formula does not include enough factors to treat fairly all of the many classes of craft entered in the Tour. Other faults, as the piots see them, can be picked from the petition filed with the aircraft events committee.

In the particular portion of their petition dealing with the Tour formula and the Tour rules the pilots embodied five paragraphs, each suggesting a radical change. The paragraphs read as follows:

"First: To provide that stick and unstick tests be made at each control point in lieu of the present system.

"Second: To provide that no less than 50 per cent. of the personnel on the contest committee be qualified transport pilots of recognized standing.

"Third: To provide, in addition to the present rules covering the cruising speed of the airplanes, that an additional consumption factor be considered either in place of, or in addition to, the displacement.

"Fourth: To provide a classification of aircraft and suitable prizes awarded to each class.

"Fifth: To provide that all propeller settings be fixed and sealed in accordance with the manufacturers' desires, at the start of the Tour, and never be changed unless a setting be out of line, in which case by mutual consent of all contestants and the referee such discrepancy be adjusted, but not in any way to deviate from the original setting as specified at the start."

Other suggestions, such as the carrying of gasoline in five gallon tins in order to facilitate an accurate check on fuel consumption, and the imposition of varied penalties in points for the various troubles that might beset a motor, were brought up for discussion during the meeting.

Much can be said about the stick and unstick suggestion in the filed petition. Many pilots on the Tour felt

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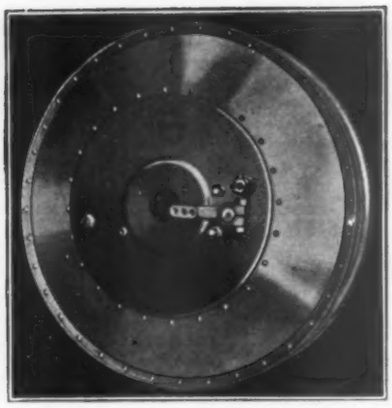

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that that particular factor played too large a part in the Tour formula. Ships equipped with brakes, they complained, were enabled to get off and land in such short spaces of time that their resultant figure of merit left no chance for the planes not fitted with brakes. One pilot even stated that lack of brakes was all that prevented him from winning the Tour. The argument in answer to that is that, in increasing the factors of safety and reliability, brakes play an important role in the construction of the modern airplane. Since the National Air Tour is, principally, a reliability contest, necessitating landings and

The 1928 Tour planes at Mahoney Field, San Diego, Calif. "Johnnie" Wood won this Tour in a Waco 10.

take-offs on fields of all sizes and descriptions, short landings and short take-offs should be largely considered.

In conducting the stick and unstick tests, however, through no fault of the Contest Committee, all of the pilots did not get the same "break." The tests were started on Ford Airport shortly following the arrival of the first Tour planes. Some of the boys arrived in time to run off their stick and unstick and speed tests in fair weather and on a dry field. Unfortunately, two days before the Tour's beginning a veritable cloudburst descended, the rain continuing at intervals until the evening before the Tour. Obviously the pilots who were compelled to make their stick and unstick and speed tests in the rain were greatly handicapped. That was one lamentable misfortune that could not be helped.

The suggestion that stick and unstick tests be made at each control point over the route seems less likely to be considered seriously by the contest committee than any other suggested change in the rules. Those who had charge of the scoring on the recent Tour know better than anyone else, the great amount of work, both for pilots and officials of the Tour, that such a procedure would entail. The muddle, the many complications of attempting to make these tests at each airport would be almost certain to create needs no detailing. Some one suggested the tests be made as the pilot landed on the airport after completing a leg, and takes off on the succeeding leg. Since, under the rules, the stick and unstick tests are supposed to be made with the full contest load, it can easily be seen that consumption of gasoline and oil over individual legs would seriously complicate the stick test taken when the plane lands at the leg terminal. Another obstacle, difficult to overcome if these tests were attempted, is that a considerable staff of carefully trained timers would have to function on every field over the route.

With reference to the fourth paragraph in the filed petition, that suggesting the classification of aircraft and the awarding of prizes to the winner of each class, this can be said:

(*Continued on page* 450)

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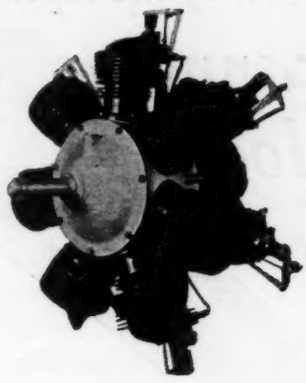

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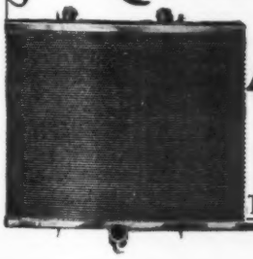

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Multi-Engined Planes Not Mentioned

It is interesting to note that the pilots, in their petition, or in their discussion, failed to bring up the rule effecting multi-motored airplanes. This rule, paragraph 39 in the official rules of the Tour, has been in the rules for the past three years, and has evoked at least one formal protest from pilots participating in the Tour.

It reads as follows:

"An entrant of a multi-engined ship will be allowed a lower cubic inch displacement figure than that which actually exists and that used in the formula provided he can demonstrate to the satisfaction of the Contest Committee that his plane is capable of performing as follows:

(a)—It will be required that the pilot of a three-motored ship climb from 1,000 ft. altitude to 2,000 ft. altitude as indicated on a calibrated altimeter carried by the contest committee observer as follows: With the center engine dead, he shall climb from 1,000 ft. to 1,400 ft., with the right engine dead he shall climb from 1,400 ft. to 1,700 ft. and with the left engine dead he shall climb from 1,700 ft. to 2,000 ft. level. If he shall accomplish this to the satisfaction of the Contest Committee observer, he will then be allowed a cubic dispacement figure of two-thirds of the actual cubic displacement of all engines."

The second and last clause in paragraph 39 deals with the required performance of dual motored ships. "Dead" in the Rule, it might be explained, means, of course, that the engine idles below the possibility of receiving thrust.

Only One Formal Protest Concerning Rule

As stated, only one formal protest has been received by the contest committee complaining of that rule. And that protest, mailed in by Eddie Stinson, was received after the 1928 Rules had been printed and distributed, hence too late to do anything about it. Perhaps one reason why other manufacturers of single motored planes have not entered formal protest is that such climbing feats by present-day tri-motored craft was not generally regarded as possible. With the verbal complaints of a number of the pilots in mind the contest committee, some time before the recent Tour, discussed the advisability of striking out the rule. The Committee, however, seemed to agree that if any three engine plane could perform in that manner it was entitled to all the credit it could get.

The National Air Tours have unquestionably been a most helpful factor in the development of American commercial aeronautics, but, as Mr. Nevill has pointed out in his article, there is a great need of formula which will place the entries on a more equal and fair basis. AVIATION *welcomes suggestions as to a formula, or some sort of arrangement, whereby such may be accomplished, and thus add to the value of America's air classic—The Editor.*

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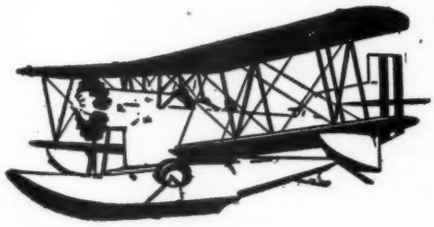

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"Well, I've had three hours on sandwiches and coffee and got my first hop today on a dairy lunch. Didn't make out so well. Made a bad landing on a gent's vest with an omelette."

"Too bad about poor old Bill, wasn't it? But in the hospital they say he's making out all right. Oh, didn't you hear. Cracked up bad. The plane hit a bump and he overshot one table, delivering a vegetarian dinner to a meat hound."

"Jim certainly is making out well. Heard he made a record for the straightaway meat course the other day. Snatched the plate away from the passenger before he ever had the potatoes buttered. He almost made an endurance record with that ship-load from the Reindeers Convention, but ran out of cracked ice and ginger ale when he had only an hour to go."

* * *

One of the Long Island pilots hung a new plane up in some trees the other day, for the third time in his flying career. This probably accounts for the story now going the rounds, that during a recent spell of bad flying weather, he overshot a nice clump of trees and had a forced landing on a flying field.

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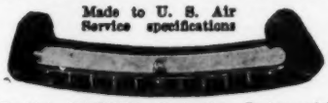
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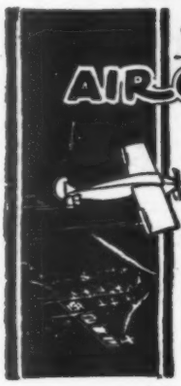

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ATTENTION AVIATORS: Valve guides installed on OX cylinders, $1.50 per guide. Removable valve seats installed, $1.00. Descriptive literature upon request. All work guaranteed. Illinois Flying Co. New location, 4 West 4th St., Sterling, Ill.

FOR SALE: One completely overhauled Wright J4-B engine. Reynolds Airways, Inc., Box 384, Garden City, N. Y.

SMITH'S PERSONAL Hammondsport OX-5 complete at $525.00. The only one left. New OX-5 cylinders $24.00. Exhaust valves 47c; intake 45c. New 26 x 4 tires $7.00; used $4.00. Wheels used $7.00. JN gas tank with valve $10.00. Cabane struts 60c. Wm. Smith, P. O. Box 31, Youngstown, Ohio.

FOR SALE: Ryan M1 monoplane. Wright Whirlwind motor. $2,500.00. Pacific Air Transport, Inc., Oakland Municipal Airport, Oakland, Calif.

JENNY WITH OX-5 motor turns 1425 on ground. Motor had 15 hours. New lower wings, new tires, two propellers, two magnetos. Quick sale for $600.00. L. D. Rentz, Lake Providence, La.

FOR SALE: Two Whirlwind J5-AB motors complete with electric starters and steel propellers. Less than 20 hours time. Also Whirlwind Laird four passenger cabin biplane with 50 hours. Will give big discount. N. L. (Sifers). Lassen Hotel, Wichita, Kans.

FOR SALE: Thomas Morse scout biplane in first class condition; newly covered. Just the ship for those 200 solo hours. OX-5 engine turns 1500 r.p.m. Will deliver within 300 miles. No reasonable offer refused. Elmer Hobbs, 2908 Edina St., Zion, Ill.

FOR SALE: Used Curtiss OX-5 motor complete with carburetor, magneto and hub. $200.00. Frank Reynolds, 601 Arlington Road, Roanoke, Va.

WACO 10, OX-5 motor, two center section gas tanks, Hartzell propeller, Miller valve action. Plane licensed and in good condition. Price $1,950.00. Ray Jones, Raven-Rock Airport, Portsmouth, Ohio.

FOR SALE: New Waco 9; lower wings; wide walks; metal spar ends wired for lights. New OXX-6 engines. Arnold Harris, Elmira, N. Y.

FOR SALE: Two standard Irving air chute seat packs which have just been overhauled by the factory and are in perfect condition. Can be had very cheaply. Stout Air Services, P. O. Box 86, Dearborn, Mich.

FOR SALE: Waco 10, OX-5, with $200.00 extras. 100 hours. Excellent condition. Price $2,700.00. Hangar 20, Curtiss Field, Garden City, N. Y.

Classified Advertising

10 cents a word, minimum charge $2.50, payable in advance. 15 cents a word if box number is used. Address replies to box numbers, care AVIATION, 250 W. 57th St., New York.

HELP WANTED

WANTED: EXPERIENCED aerial photographer. Steady job. Chance for advancement. Write giving details. Box 7, 341 East 149th St., New York City.

POSITIONS WANTED

PILOT 300 hours, licensed airplane and engine mechanic, five years' experience. One year with air mail as mechanic. Good record. Paul R. Baldwin, 187 East Bridge St., Berea, Ohio.

POSITION WANTED by thoroughly experienced limited commercial pilot. First class references as to character and ability. R. L. Gregory, 205 E. 22nd St., Kansas City, Mo.

EXPERIENCED ENGINEER draftsman for layout and detail work. Fine opportunity. Permanent position. State experience and salary first letter. H. E. Weihmiller, 1001 Miami Savings Bldg., Dayton, O.

WHIRLWIND EXPERT, 10 years of field and shop experience, desires make connection with eastern operator. Box 1059, AVIATION.

POSITION WANTED: Pilot with 150 hours. Thorough mechanic also factory experience. References. Go anywhere. Salary nominal. Box 1069, AVIATION.

MECHANIC, LICENSED, age 29, experience at factory and field. 18 hours solo. Will do any repair work except welding and take solo as part payment. Box 1066, AVIATION.

MY EXPERIENCE as follows: American citizen, wide social connections, age 32, single, electrical engineer, transport pilot, airplane and engine mechanic. Present position, assistant sales manager of $10,000,000.00 annual business. Started in 1915 as apprentice. Have formed and operated two profitable side businesses which have just profitably sold. Have traveled over whole United States and Europe and speak French. Have also had scholastic and practical training in accounting, advertising and business law. Firm faith in future of aviation and would like change position to aviation industry where my interest lies and my experience can prove profitable to my employer and consequently myself. Box 1070, AVIATION.

EQUIPMENT WANTED

HISSO E MOTORS wanted: Must be in good condition. Answer fully describing condition and lowest cash price. Box 1068, AVIATION.

WANTED: OX-5 USED motors. J. Finkel, 76 Emerson Place, Brooklyn, N. Y.

WANTED: CRACKED new production ships. Must be priced low. State full details in first letter. Crack-ups rebuilt on contract. Buess Garage, Box 783, Coggon, Iowa.

I WANT to buy for cash one fuselage suitable for Gnome motor. May be bare or need repairs. Must be cheap. Cannot pay over $60.00. Must have landing gear, etc. Johnny Bartee, Box 244, Perry, Fla.

WANTED: USED OX-5 airplane without motor. New production preferred. John Ruzicka, Kanona, Kans.

MISCELLANEOUS

WINTER WITH US: We offer free rent and plenty of work for go-getters, if you own a licensed plane and a transport license. 307 Alexander Bldg., Tulsa, Okla.

TRADE 1926 Dusenburg special straight eight roadster with rumble seat and supercharger in A1 condition, cost new $8,400.00, for three model E 180 Hissos or what have you? W. E. Buckler, 487 Belmont Ave., Springfield, Mass.

WRITE FOR price list, aircraft accessories, OX-5 motors, large stock OX-5 parts, wings and parts for Standard J1, Jenny and Canuck. Prompt reply, quick shipment. J. L. Schroeder Co., 6523 Harrisburg Blvd., Houston, Tex.

MACHINE SHOP service on OX-5s. Cylinders reground, new pistons, pins and rings. Graphite guides and inserted seats installed. Oversize pins installed in valve actions. Main and connecting rod bearings line reamed. New OX-5 parts. Write for complete circular. Heckman Machine Works, 4026 W. Lake St., Chicago, Ill.

I HAVE Hudson speedster, good rubber, new cream duco, a dandy. Will trade for used T. M. LeRhone scout—or what have you? C. R. Hand, 422 West 4th, Chanute, Kans.

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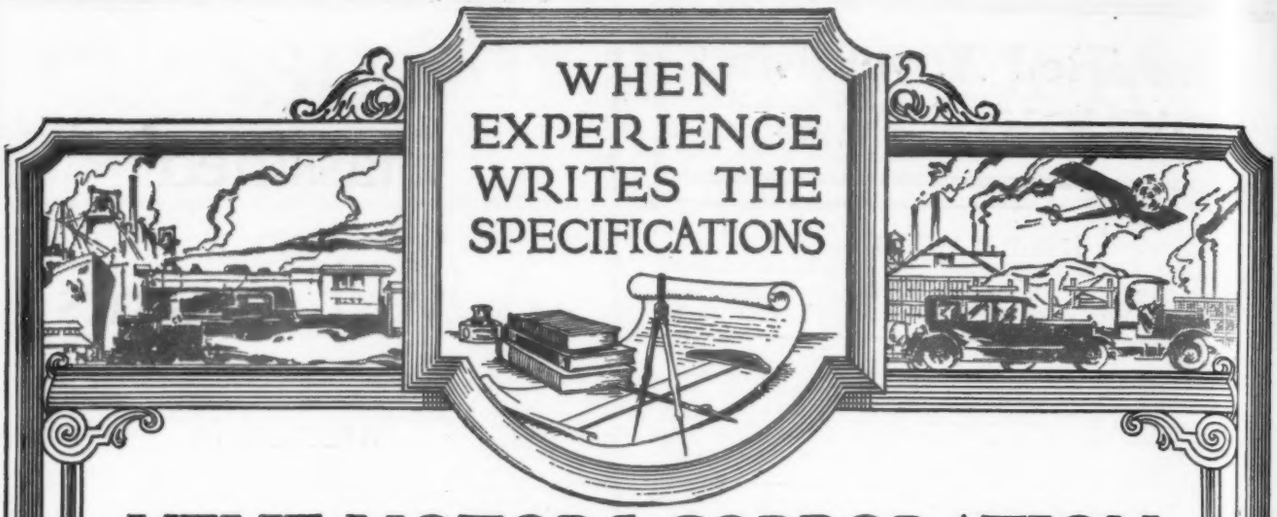
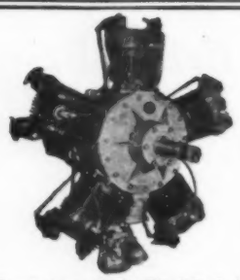


VELIE MOTORS CORPORATION

Uses Nickel Steel Vital Parts for Aircraft Engines



Front view of Velie Fixed Radial, 5-Cylinder, 70 H. P. Aircraft Engine used by Mono-Aircraft, Inc., Moline, Ill. Cylinders are made of Cast Nickel Steel.

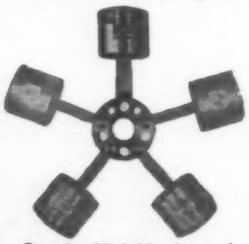
Nickel Steel Vital Parts of Velie Aircraft Engine

Front thrust bearing sleeve
Rear bearing sleeve
Tachometer drive sleeve
Magneto coupling flanges
Valve spring retainer
Rocker shaft bracket
Rocker shaft
Rocker arms
Intake tube flange
Valve lifters
Valve springs
Rocker arm cup
Rocker arm button
Push rod ends
Camshaft
Camshaft drive gear
Camshaft drive gear nut
Cam drive shaft gear
Cam
Cam drive shaft
Crankshaft front half
Crankshaft bearing nuts
Crankshaft rear half
Propeller hub
Propeller flange
Propeller nuts
Counterweight screws
Master connecting rod
Connecting rod links
Wrist and piston pins
Oil return pump gear
By pass valve
Oil pressure pump gears
Oil pump gear shaft
Cylinders—Cast Nickel Steel
All bolts, nuts, studs—Nickel Steel

THE Velie Aircraft Engine is installed in a two-place Monocoupe, a lighter type of airplane designed to take off in from three to five seconds and maintain a speed of 100 miles per hour, with a cruising radius of 400 miles. The dependable performance of this compact little power plant makes possible the remarkable maneuverability of this ship —an advantage which can be traced back to the dependability of the Nickel Steel parts.

All vital parts of Velie Aircraft Engines are made of Nickel Alloy Steel. The uniformly high physical properties of Nickel Alloy Steel insure dependable performance in parts that must be pared to the minimum to save weight.

The performance records of the Nickel Alloy Steel parts used by leading manufacturers are conclusive evidence of the dependability of these Alloys. The experience of typical users has contributed to an extensive fund of valuable technical information. You are invited to consult our engineers and thus draw upon these helpful data.



One piece Nickel Steel master connecting rod and four link rods assembled with piston.

Two piece counterbalanced Nickel Steel crankshaft.

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NICKEL STEEL

Nickel
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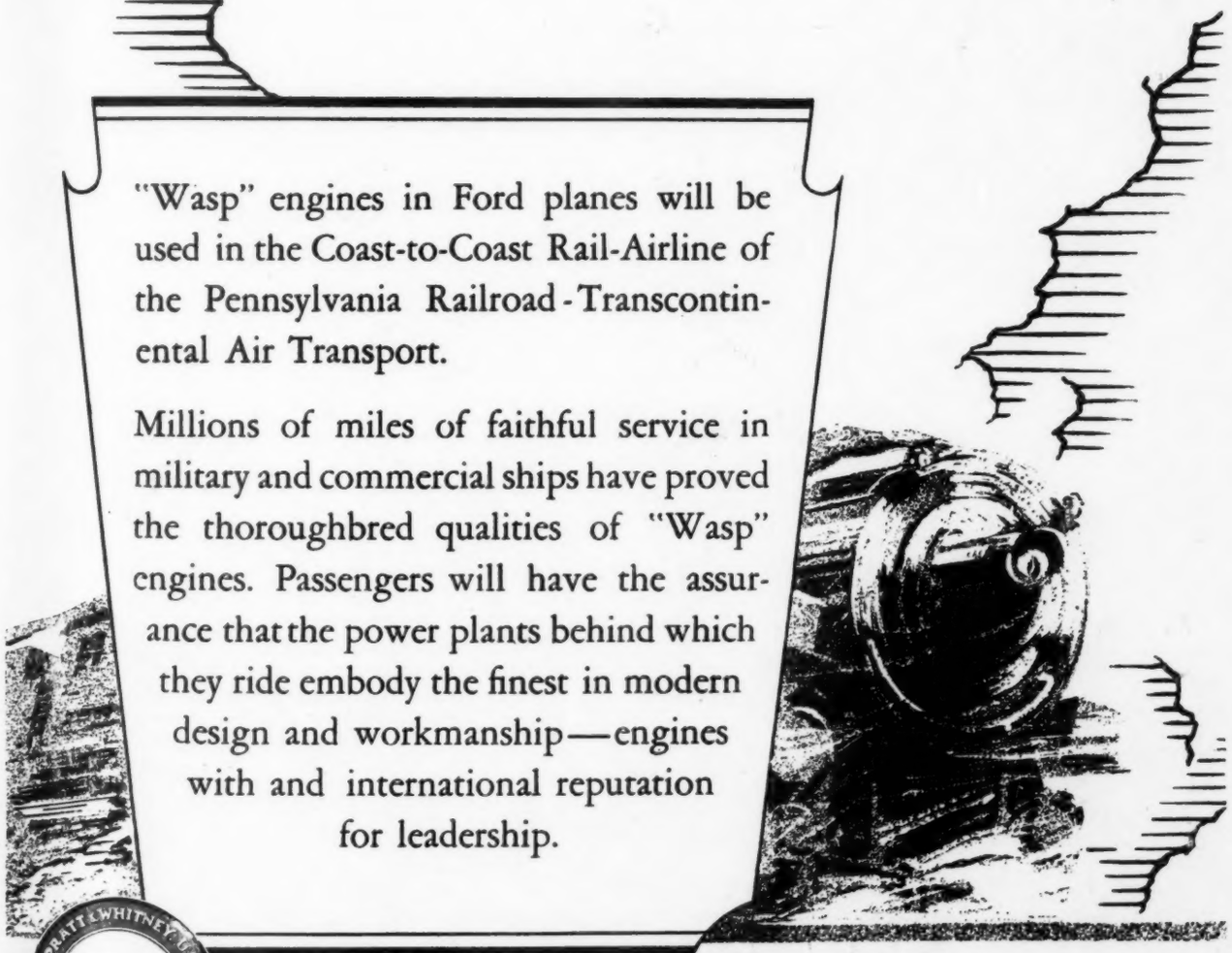
Send for "Buyers' Guide to Nickel Alloy Steel Products"

INCO NICKEL THE INTERNATIONAL NICKEL COMPANY (INC.), 67 WALL STREET, NEW YORK, N. Y. INCO NICKEL

When the World's Crack Trains are too Slow!

"Wasp" engines in Ford planes will be used in the Coast-to-Coast Rail-Airline of the Pennsylvania Railroad - Transcontinental Air Transport.

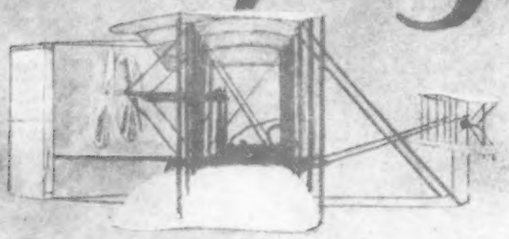
Millions of miles of faithful service in military and commercial ships have proved the thoroughbred qualities of "Wasp" engines. Passengers will have the assurance that the power plants behind which they ride embody the finest in modern design and workmanship—engines with and international reputation for leadership.



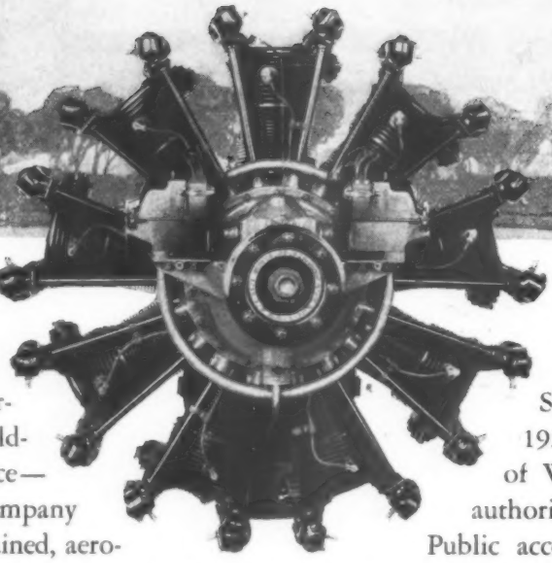
PRATT & WHITNEY U.S.A. DEPENDABLE ENGINES

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

WRIGHT *in* 1903



The airplane in which Orville Wright, on December 17, 1903, made the first successful, sustained flight in a heavier-than-air machine at Kitty Hawk, North Carolina, was powered with a Wright Engine.



IN the three fundamentals —experimental engineering, experience in engine building, and proved performance— Wright gained, and the company which they founded has retained, aeronautical engine leadership... The story of Wright Engines is the story of aeronautical achievement. Each distinct advance from Kitty Hawk in 1903 to the outfitting of the latest South Polar expedition of 1929 has carried the sum total of Wright experience and the authority of its research.

Public acceptance—public trust—has brought with it the responsibility of leadership —responsibility to plane manufacturer, to air line operator, to pilot, and to passenger.

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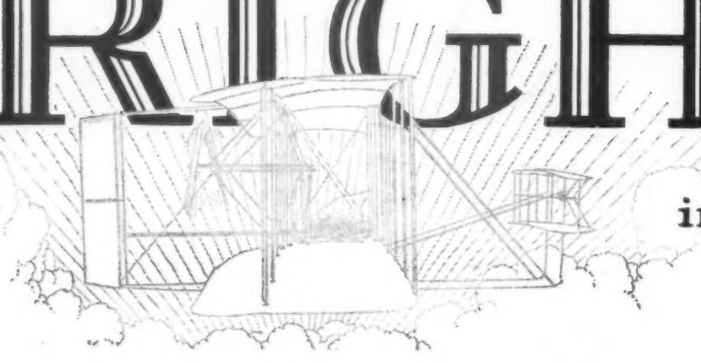

The First Name in Flying